

**Final**

# **Wildlife Resources Technical Report**

**Shasta Lake Water Resources Investigation, California**

*Prepared by:*

**United States Department of the Interior  
Bureau of Reclamation  
Mid-Pacific Region**



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# Contents

<b>Chapter 1 Affected Environment .....</b>	<b>1-1</b>
Environmental Setting .....	1-9
Wildlife .....	1-9
Other Wildlife Resources .....	1-121
Regulatory Framework .....	1-122
Federal .....	1-122
State.....	1-129
Regional and Local.....	1-131
Federal, State, and Local Programs and Projects .....	1-133
<b>Chapter 2 Wildlife Resources Attachments.....</b>	<b>2-1</b>
<b>Chapter 3 References .....</b>	<b>3-1</b>

## Tables

Table 1-1. MSCS Cross-Reference of Habitat Types in the Project Study Area and MSCS.....	1-9
Table 1-2. Summary of Wildlife Habitats in the Impoundment Area .....	1-11
Table 1-3. Summary of Wildlife Habitats in the Relocation Areas .....	1-12
Table 1-4. Summary of Wildlife Habitats in the Potential Sacramento River Downstream Habitat Restoration Areas .....	1-34
Table 1-5. Wildlife Species of Concern in the Shasta Lake and Vicinity Portion of the Primary Study Area .....	1-57
Table 1-6. Wildlife Species of Concern in the Potential Sacramento River Downstream Habitat Restoration Areas .....	1-88
Table 1-7. Special-Status Wildlife Species Known or with Potential to Occur in the Primary Study Area, Along the Sacramento River from Shasta Dam to Red Bluff Diversion Dam.....	1-91

## Figures

Figure 1-1. Study Limits .....	1-3
Figure 1-2. General Location Map Downstream Potential River Restoration Areas .....	1-5
Figure 1-3a. California Wildlife Habitat Relationship Types .....	1-13
Figure 1-3b. California Wildlife Habitat Relationship Types .....	1-15
Figure 1-3c. California Wildlife Habitat Relationship Types .....	1-17
Figure 1-3d. California Wildlife Habitat Relationship Types .....	1-19
Figure 1-3e. California Wildlife Habitat Relationship Types .....	1-21
Figure 1-3f. California Wildlife Habitat Relationship Types .....	1-23
Figure 1-4a. California Wildlife Habitat Relationship Types – Henderson Open Space .....	1-37
Figure 1-4b. California Wildlife Habitat Relationship Types – Tobiasson Island .....	1-39
Figure 1-4c. California Wildlife Habitat Relationship Types – Shea Island Complex .....	1-41
Figure 1-4d. California Wildlife Habitat Relationship Types – Kapusta Island .....	1-43
Figure 1-4e. California Wildlife Habitat Relationship Types – Anderson River Park .....	1-45
Figure 1-4f. California Wildlife Habitat Relationship Types – Reading Island .....	1-47
Figure 1-5. Central Valley Project and State Water Project Service Areas .....	1-52
Figure 1-6a. Special-Status Wildlife Occurring in Shasta Lake and Vicinity .....	1-63
Figure 1-6b. Special-Status Wildlife Occurring in Shasta Lake and Vicinity .....	1-65
Figure 1-6c. Special-Status Wildlife Occurring in Shasta Lake and Vicinity .....	1-67
Figure 1-6d. Special-Status Wildlife Occurring in Shasta Lake and Vicinity .....	1-69
Figure 1-6e. Special-Status Wildlife Occurring in Shasta Lake and Vicinity .....	1-71
Figure 1-6f. Special-Status Wildlife Occurring in Shasta Lake and Vicinity .....	1-73
Figure 1-7a. Special-Status Terrestrial Mollusks Occurring in Shasta Lake and Vicinity .....	1-75
Figure 1-7b. Special-Status Terrestrial Mollusks Occurring in Shasta Lake and Vicinity .....	1-77
Figure 1-7c. Special-Status Terrestrial Mollusks Occurring in Shasta Lake and Vicinity .....	1-79
Figure 1-7d. Special-Status Terrestrial Mollusks Occurring in Shasta Lake and Vicinity .....	1-81
Figure 1-7e. Special-Status Wildlife Occurring in Shasta Lake and Vicinity .....	1-83
Figure 1-7f. Special-Status Terrestrial Mollusks Occurring in Shasta Lake and Vicinity .....	1-85
Figure 1-8a. Sensitive Biological Resources Between Shasta Dam and Red Bluff Pumping Plant .....	1-95
Figure 1-8b. Sensitive Biological Resources Between Shasta Dam and Red Bluff Pumping Plant .....	1-97
Figure 1-8c. Sensitive Biological Resources Between Shasta Dam and Red Bluff Pumping Plant .....	1-99
Figure 1-8d. Sensitive Biological Resources Between Shasta Dam and Red Bluff Pumping Plant .....	1-101
Figure 1-8e. Sensitive Biological Resources Between Shasta Dam and Red Bluff Pumping Plant .....	1-103

Figure 1-8f. Sensitive Biological Resources Between Shasta Dam and Red Bluff Pumping Plant.....	1-105
Figure 1-8g. Sensitive Biological Resources Between Shasta Dam and Red Bluff Diversion Dam.....	1-107
Figure 1-8h. Sensitive Biological Resources between Shasta Dam and Red Bluff Pumping Plant.....	1-109
Figure 1-8i. Sensitive Biological Resources between Shasta Dam and Red Bluff Pumping Plant.....	1-111
Figure 1-8j. Sensitive Biological Resources between Shasta Dam and Red Bluff Diversion Dam.....	1-113

## Attachments

Attachment 1.	Special-Status Wildlife Species Potentially Occurring in the Shasta Lake and Vicinity Portion of the Primary Study Area
Attachment 2.	Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area
Attachment 3.	Breeding Bird Survey Results – Breeding Bird Surveys 2007 - 2013
Attachment 4.	Species Accounts for Special-Status Wildlife in the Primary Study Area Downstream from Shasta Dam
Attachment 5.	Federal Lists of Special-Status Wildlife Species in the Shasta Lake and Vicinity Portion of the Primary Study Area
Attachment 6.	Special-Status Wildlife Species with Potential to Occur in the Primary and Extended Study Areas by Area
Attachment 7.	List of All Sensitive Wildlife Species in the Extended Study Area Reported to the CNDDB
Attachment 8.	Forest Carnivore Survey Report
Attachment 9.	Shasta Salamander Survey Report
Attachment 10.	Terrestrial Mollusk Survey Report
Attachment 11.	California Red-legged Frog Habitat Assessment Reports, Shasta Lake and Vicinity Portion of the Primary Study Area
Attachment 12.	Biological Characterizations, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Henderson Open Space
Attachment 13.	Biological Characterizations, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Tobiasson Island

- Attachment 14. Biological Characterizations, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Shea Island Complex
- Attachment 15. Biological Characterizations, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Kapusta Island
- Attachment 16. Biological Characterizations, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Anderson River Park
- Attachment 17. Biological Characterizations, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Reading Island
- Attachment 18. California Red-legged Frog Habitat Assessment, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Henderson Open Space
- Attachment 19. California Red-legged Frog Habitat Assessment, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Tobiasson Island
- Attachment 20. California Red-legged Frog Habitat Assessment, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Shea Island Complex
- Attachment 21. California Red-legged Frog Habitat Assessment, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Kapusta Island
- Attachment 22. California Red-legged Frog Habitat Assessment, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Anderson River Park
- Attachment 23. California Red-legged Frog Habitat Assessment, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Reading Island

## Abbreviations and Acronyms

Bay-Delta	San Francisco Bay/Sacramento–San Joaquin River Delta
BLM	U.S. Department of the Interior, Bureau of Land Management
CALFED	CALFED Bay-Delta Program
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CNDDDB	California Natural Diversity Database
CVP	Central Valley Project
Delta	Sacramento–San Joaquin River Delta
DWR	California Department of Water Resources
ESA	(Federal) Endangered Species Act
FR	Federal Register
HEP	Habitat Evaluation Procedure
I-5	Interstate 5
LRMP	Land and Resource Management Plan
MBTA	Migratory Bird Treaty Act
MOU	memorandum of understanding
MSCS	Multi-Species Conservation Strategy
msl	mean sea level
NMFS	National Marine Fisheries Service
NRA	National Recreation Area
RBPP	Red Bluff Pumping Plant
RCD	resource conservation district
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
Resources Agency	California Natural Resources Agency (formerly known as the California Resources Agency or the State Resources Agency)
RHJV	Riparian Habitat Joint Venture
RM	River Mile
ROD	record of decision
RWQCB	regional water quality control board
SB	Senate Bill

Shasta Lake Water Resources Investigation  
Biological Resources Appendix – Wildlife Resources Technical Report

SLWRI	Shasta Lake Water Resources Investigation
SRCA	Sacramento River Conservation Area
SRNWR	Sacramento River National Wildlife Refuge
STNF	Shasta-Trinity National Forest
SWAG	Sacramento Watersheds Action Group
SWP	State Water Project
TNC	The Nature Conservancy
USC	U.S. Code
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey



# Chapter 1

## Affected Environment

This chapter describes the affected environment related to wildlife resources, including special-status species, for the dam and reservoir modifications under the Shasta Lake Water Resources Investigation (SLWRI).

Because of the potential influence of the modification of Shasta Dam, and subsequent water deliveries over a rather large geographic area, the SLWRI includes both a primary study area and an extended study area. This chapter describes the wildlife and special-status species present within the primary study area, which includes Shasta Dam and Shasta Lake, all contributing major and minor tributaries, and the Sacramento River downstream to Red Bluff Pumping Plant (RBPP) (including contributing tributaries within this reach of the Sacramento River). Common wildlife and special-status species within the extended study area are also discussed, but in less detail. The extended study area includes the Sacramento River basin from RBPP south to the Sacramento–San Joaquin River Delta (Delta). It also includes the San Francisco Bay/Sacramento–San Joaquin River Delta (Bay-Delta) area, portions of the American and San Joaquin River basins, and the Central Valley Project (CVP) and State Water Project (SWP) service areas.

Shasta Dam and Shasta Lake are located on the upper Sacramento River in Northern California. Shasta Dam is located approximately 9 miles northwest of Redding, and the dam and entire reservoir are located in Shasta County. Elevations in the Shasta Lake and vicinity portion of the primary study area range between approximately 1,070 and 1,200 feet, and the terrain is moderate to steep.

The wildlife resources setting for the Shasta Lake and vicinity portion of the primary study area consists of the impoundment area (five arms and the main body of Shasta Lake) and the relocation areas (Figure 1-1). The Shasta Lake and vicinity portion of the primary study area is composed of Shasta Dam and Shasta Lake and the lower reaches of the tributaries draining into Shasta Lake.

The U.S. Department of the Interior, Bureau of Reclamation (Reclamation) established project boundaries for focused surveys in the area that would be subject to inundation under various enlargement scenarios. The lower boundary corresponds to the current full pool elevation defined by Reclamation (1,070-foot mean sea level (msl) contour line). The upper boundary was established using the 1,090-foot msl contour line around the entire lake. This area is hereafter referred to as the “impoundment area” (Figure 1-1).

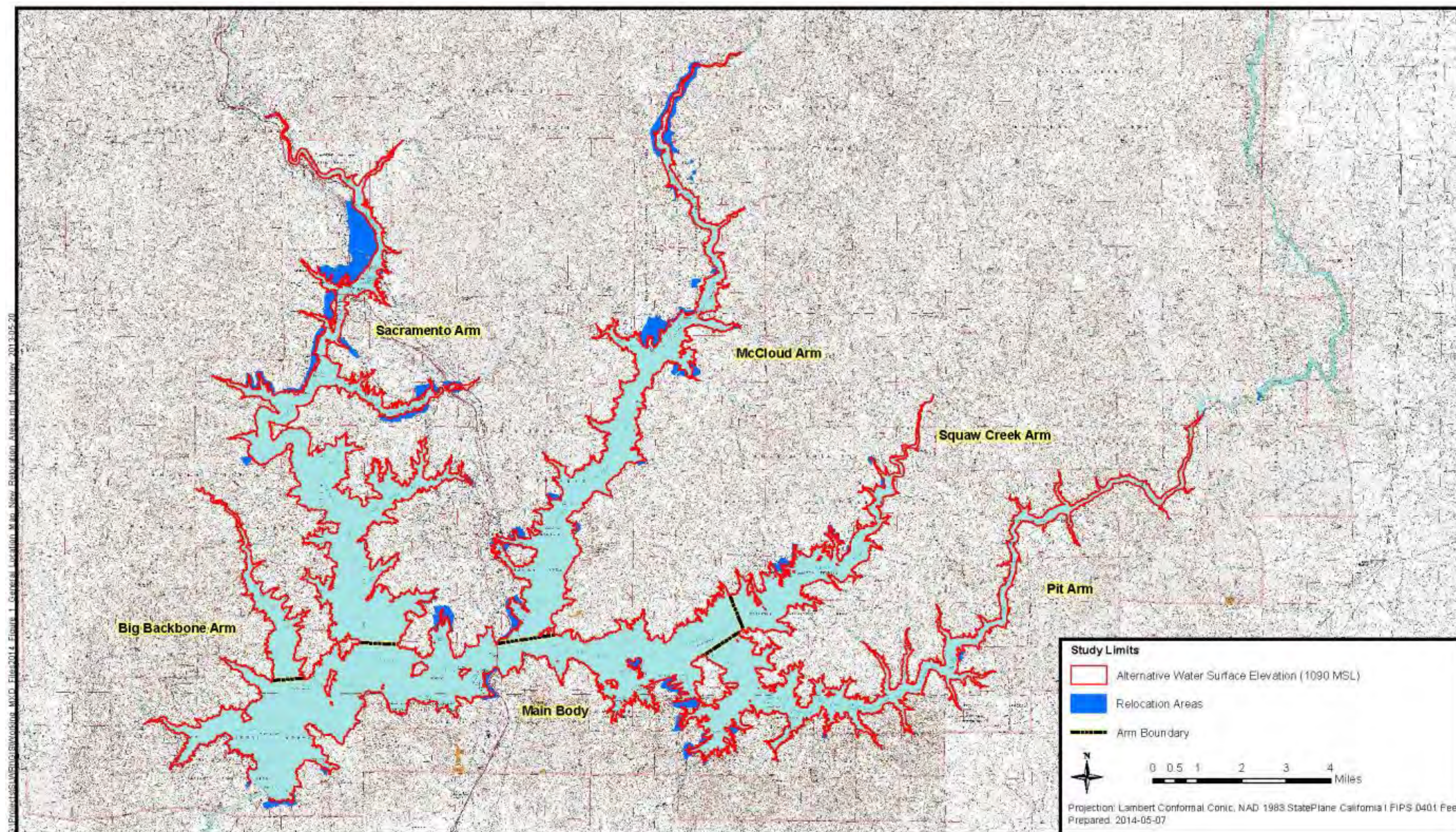
To examine the physical and biological resources along riverine reaches that would be subject to inundation if Shasta Dam were enlarged, reaches of 11 streams and rivers that are tributary to Shasta Lake were also incorporated into the Shasta Lake and vicinity portion of the primary study area. These streams were selected by Reclamation in conjunction with the U.S. Forest Service (USFS) as an initial sampling of streams representative of riverine and riparian habitats.

Areas subject to physical disturbance as an indirect result of the project (i.e., relocation sites for roadways, bridges, utilities, and campgrounds that would be inundated subsequent to the enlargement of Shasta Dam as well as dike locations) were incorporated into the Shasta Lake and vicinity portion of the primary study area. These locations are referred to as relocation areas (Figure 1-1).

As a component of the SLWRI, Reclamation proposes to restore and/or enhance riparian and riverine habitats at six locations along the lower Sacramento River below Shasta Dam. These six locations occur generally between the cities of Redding and Red Bluff California. The purpose of the restoration effort is to improve spawning and rearing habitat for anadromous fish occurring in the Sacramento River. These six locations are referred to as the potential Sacramento River downstream habitat restoration areas (Figure 1-2).

For the purposes of this investigation, approximate acreages for habitat types are reported by arm of the lake. For a relocation area that falls between two arms, the area is included with the arm that has the most acreage of the vegetation type or water of the United States.





### Figure 1-1. Study Limits



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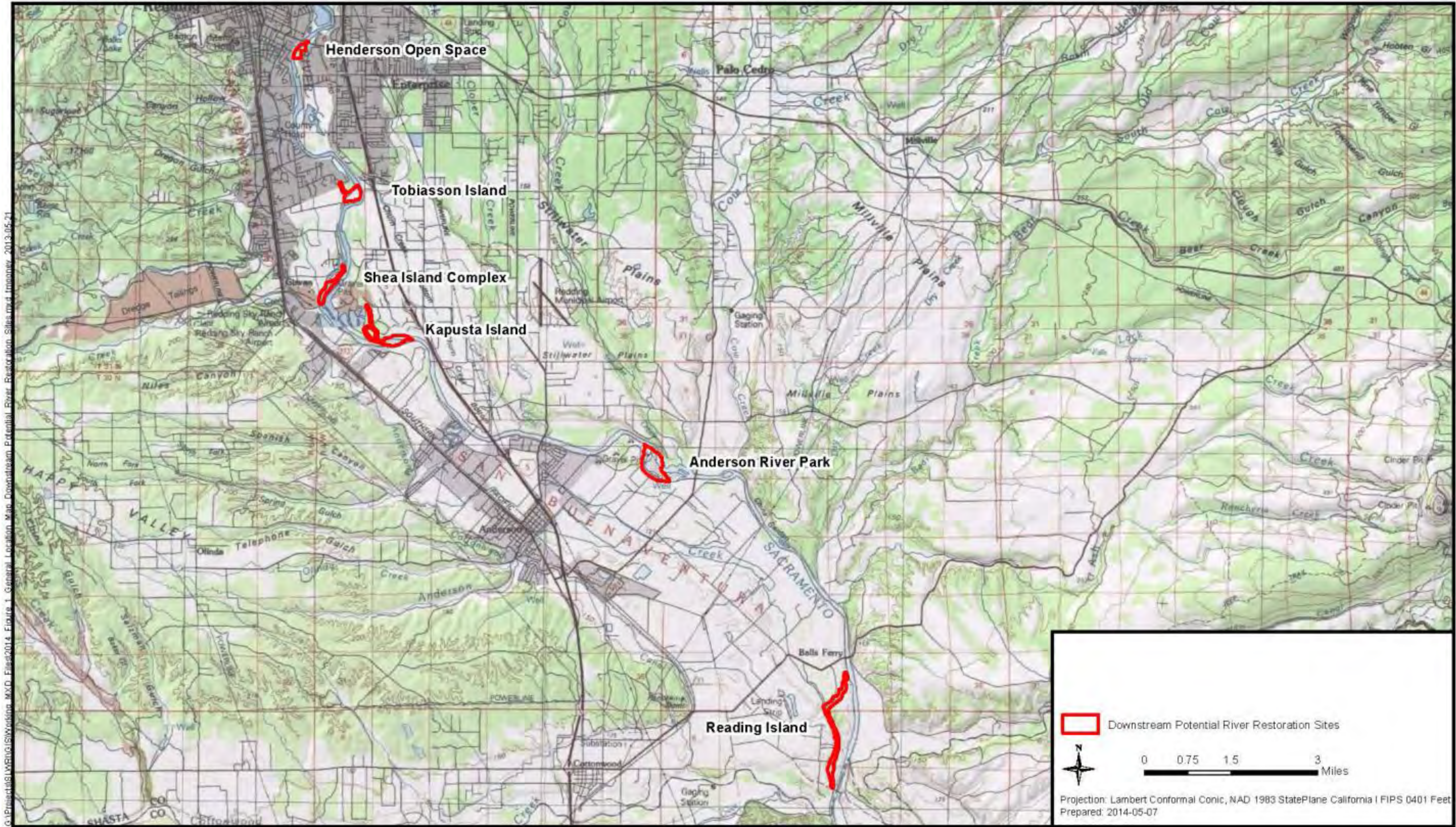


Figure 1-2. General Location Map Downstream Potential River Restoration Areas



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Descriptions of biological resources were derived primarily from the following sources:

- Shasta Lake Water Resources Investigation Mission Statement Milestone Report (Reclamation 2003)
- Shasta Lake Water Resources Investigation Initial Alternatives Information Report (Reclamation 2004)
- Chapter 3, “Biological Environment,” in the Draft Shasta Lake Water Resources Investigation Plan Formulation Report (Reclamation 2007)
- U.S. Fish and Wildlife Service (USFWS) Endangered Species Lists
- The California Natural Diversity Database
- Numerous technical studies of botanical, wetland, and wildlife resources conducted by Reclamation in the Shasta Lake and vicinity portion of the primary study area since 2002

Several attachments to this technical report provide detailed lists and descriptions of special-status wildlife species present in the primary and extended study areas:

- Attachment 1, “Special-Status Wildlife Species Potentially Occurring in the Shasta Lake and Vicinity Portion of the Primary Study Area”
- Attachment 2, “Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area”
- Attachment 3, “Breeding Bird Surveys 2007 – 2013”
- Attachment 4, “Species Accounts for Special-Status Wildlife in the Primary Study Area Downstream from Shasta Dam”
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- Attachment 6, “Special-Status Wildlife Species with Potential to Occur in the Primary and Extended Study Areas by Area”
- Attachment 7, “List of All Sensitive Wildlife Species in the Extended Study Area Reported to the CNDDDB”
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- Attachment 15, “Biological Characterizations, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Kapusta Island”
- Attachment 16, “Biological Characterizations, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Anderson River Park”
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- Attachment 21, “California Red-legged Frog Habitat Assessment, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Kapusta Island”



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## Environmental Setting

### Wildlife

The primary and extended study areas support a variety of habitats including riparian forest, oak woodland, riparian scrub, chaparral, annual grassland, vernal pools, seasonal and permanent wetlands, estuaries, tidal sloughs and marshes, and agricultural lands. Each of these habitats supports its own unique assemblage of wildlife species.

Deforestation, cattle grazing, water development, flood protection, and the expansion of agriculture and urban land uses onto historic floodplains have considerably altered the historic landscape. Much of the remaining habitat areas exist as a mosaic of fragmented upland communities or narrow strips of riparian habitat along the Sacramento River and its tributary creeks and sloughs.

Although the remaining riparian habitat along the Sacramento River corridor is limited, it supports a diverse collection of wildlife and supplies shade, cover, and organic material to the adjacent streamside environment, which benefits both the floral and faunal species that are closely associated with the riparian environment.

Table 1-1 cross references between the habitat types described in this document and the types evaluated in the CALFED Bay-Delta Program’s (CALFED) Multi-Species Conservation Strategy (MSCS) (CALFED 2000a).

**Table 1-1. MSCS Cross-Reference of Habitat Types in the Project Study Area and MSCS**

<b>Plant Community and Habitat Types in Primary and Extended Study Area</b>	<b>MSCS Habitat Type</b>	<b>MSCS Goal</b>
Klamath mixed conifer	Montane woodland and forest	Avoid, minimize, and compensate for loss where evaluated species are affected.
Ponderosa pine	Montane woodland and forest	Avoid, minimize, and compensate for loss where evaluated species are affected.
Closed-cone pine	Montane woodland and forest	Avoid, minimize, and compensate for loss where evaluated species are affected.
Montane hardwood–conifer	Montane woodland and forest	Avoid, minimize, and compensate for loss where evaluated species are affected.

**Table 1-1. MSCS Cross-Reference of Habitat Types in the Project Study Area and MSCS (contd.)**

<b>Plant Community and Habitat Types in Primary and Extended Study Area</b>	<b>MSCS Habitat Type</b>	<b>MSCS Goal</b>
Montane hardwood	Montane woodland and forest	Avoid, minimize, and compensate for loss where evaluated species are affected.
Blue oak/oak woodland	Valley/foothill woodland and forest	Avoid, minimize, and compensate for loss where evaluated species are affected.
Blue oak–gray pine	Valley/foothill woodland and forest	Avoid, minimize, and compensate for loss where evaluated species are affected.
Mixed chaparral	Upland scrub	Avoid, minimize, and compensate for loss where evaluated species are affected.
Montane riparian	Montane riparian	Substantially increase extent and quality.
Riparian woodland	Valley/foothill riparian	Substantially increase extent and quality.
Riparian scrub	Valley/foothill riparian (if woody; otherwise none)	If woody scrub, substantially increase extent and quality.
Fresh emergent wetland	Nontidal freshwater permanent emergent	Substantially increase extent and quality.
Tidal emergent wetland	Saline emergent Tidal freshwater emergent	Substantially increase extent and quality.
Tidal perennial aquatic	Tidal perennial aquatic	Substantially increase extent and quality.
Lacustrine	Lacustrine	Substantially increase extent and quality.
Riverine	Valley riverine aquatic Montane riverine aquatic	Substantially increase extent and quality.
Open water	Included in one of the following: tidal perennial aquatic, valley riverine aquatic montane riverine aquatic, or lacustrine	Substantially increase extent and quality.
Annual grassland	Grassland	<i>Perennial grassland</i> : Substantially increase extent and quality. <i>Annual grassland</i> : Avoid, minimize, and compensate for loss where evaluated species are affected.
Agriculture	Upland cropland Seasonally flooded agricultural land	Protect, enhance, or restore
Barren	Not included in ERP	--
Urban	Not included in ERP	--

Source: CALFED 2000a

Note:

Goals for habitats were developed within the Ecosystem Restoration Program (ERP) and the Strategic Plan for Ecosystem Restoration (CALFED 2000b).

Key:

ERP = Ecosystem Restoration Program

MSCS = Multi-Species Conservation Strategy

**Primary Study Area**

**Shasta Lake and Vicinity** Wildlife resources described in this chapter result from the wealth and diversity of climatic and vegetative associations in and adjacent to the Shasta Lake and vicinity portion of the primary study area. Influences from the Coast Ranges, the southern Cascade Range, the northern Sierra Nevada, the Great Basin, and the Central Valley provide for a unique mix of biota. Much of this region, especially in the Central Valley, has been modified by past and present land uses.

**Wildlife Habitats** The Shasta Lake and vicinity portion of the primary study area is characterized by a variety of habitats typical of mixed woodlands and low-elevation forests found in the southeastern Klamath Mountains. These habitats were mapped and classified using the *Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988). Habitats present in the Shasta Lake and vicinity portion of the primary study area are summarized in Tables 1-2 and 1-3, and depicted in Figures 1-3a through 1-3f. General habitat descriptions including typically occurring wildlife species are described below. Plant taxonomy follows Baldwin et al. (2012).

**Table 1-2. Summary of Wildlife Habitats in the Impoundment Area**

Habitat	Area (acres*)						Total
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm	
Annual grassland	0.44	0.00	3.10	0.70	0.00	0.38	4.62
Barren	2.30	0.00	10.60	3.56	0.00	1.35	17.81
Blue oak–foothill pine	10.36	0.00	0.00	0.00	4.29	32.33	46.98
Blue oak woodland	0.00	0.00	0.00	0.00	0.00	4.18	4.18
Closed-cone pine–cypress	32.68	0.00	12.95	20.89	44.72	70.52	181.77
Douglas-fir	0.00	0.00	0.00	0.36	0.00	0.00	0.36
Klamath Mixed Conifer	0.00	0.00	0.00	0.00	0.00	10.96	10.96
Mixed chaparral	29.19	13.64	161.04	15.14	10.35	12.99	242.36
Montane hardwood	73.49	38.76	171.01	70.36	19.43	78.84	451.91
Montane hardwood–conifer	70.68	0.99	150.42	136.54	111.63	179.48	649.76
Montane riparian	4.16	6.67	26.16	13.91	1.53	5.52	57.94
Ponderosa pine	215.11	30.72	188.19	161.64	49.56	122.07	767.30
Riverine	0.00	0.88	5.24	15.43	1.41	0.00	22.96

**Table 1-2. Summary of Wildlife Habitats in the Impoundment Area (contd.)**

Habitat	Area (acres*)						Total
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm	
Urban	21.95	0.00	1.95	7.96	0.00	0.00	33.14
Total	460.37	91.67	730.72	446.49	242.92	519.90	2492.07

Notes:

\*Acreage values are approximate.

\*\*Lacustrine values are included for the entire surface area of Shasta Lake. The extent of activity occurring within Shasta Lake has yet to be determined.

**Table 1-3. Summary of Wildlife Habitats in the Relocation Areas**

Habitat	Area (acres*)						Total
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm	
Annual grassland	4.79	0.00	26.46	9.75	0.84	0.23	42.07
Barren	22.37	0.00	72.18	29.71	11.53	12.06	147.86
Blue oak–foothill pine	1.91	0.00	0.00	0.00	0.00	7.24	9.16
Blue oak woodland	0.00	0.00	0.00	3.68	0.00	0.92	4.59
Closed-cone pine–cypress	0.11	0.00	41.98	9.63	1.94	12.50	66.15
Douglas-fir	0.00	0.00	0.00	3.02	0.00	0.00	3.02
Mixed chaparral	12.65	0.00	56.11	26.92	4.44	133.98	134.11
Montane hardwood	35.81	0.00	137.77	148.13	6.34	0.13	328.17
Montane hardwood–conifer	104.31	0.00	117.35	221.40	29.04	30.09	502.17
Montane riparian	0.34	0.00	1.35	3.08	0.23	0.02	5.02
Ponderosa pine	156.24	0.00	398.26	272.10	43.08	22.09	891.77
Riverine	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban	20.66	0.00	228.60	0.48	0.00	0.57	250.30
Total	359.20	0.00	1080.05	727.90	119.83	119.83	2384.42

Note:

\*Acreage values are approximate.



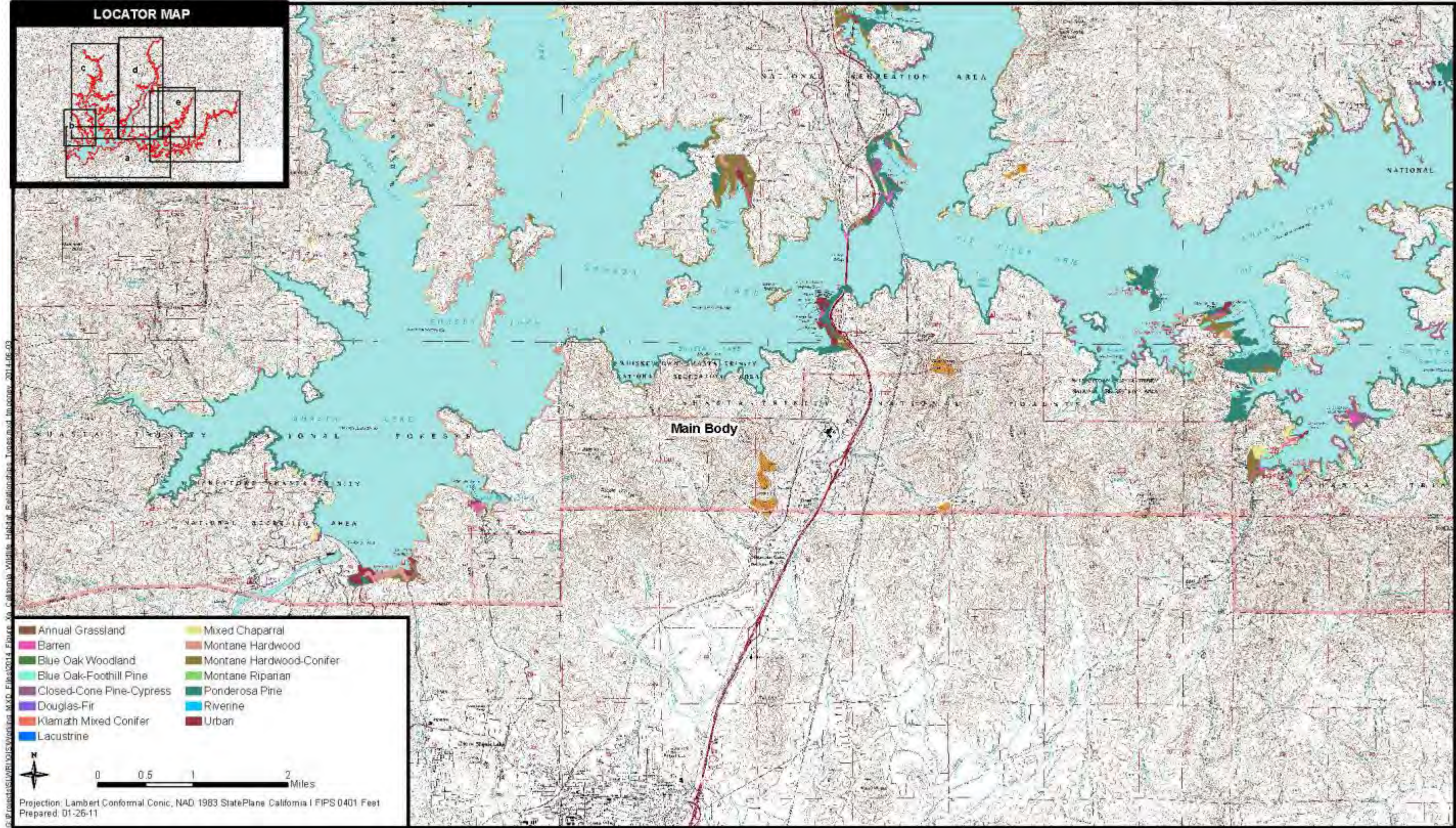


Figure 1-3a. California Wildlife Habitat Relationship Types



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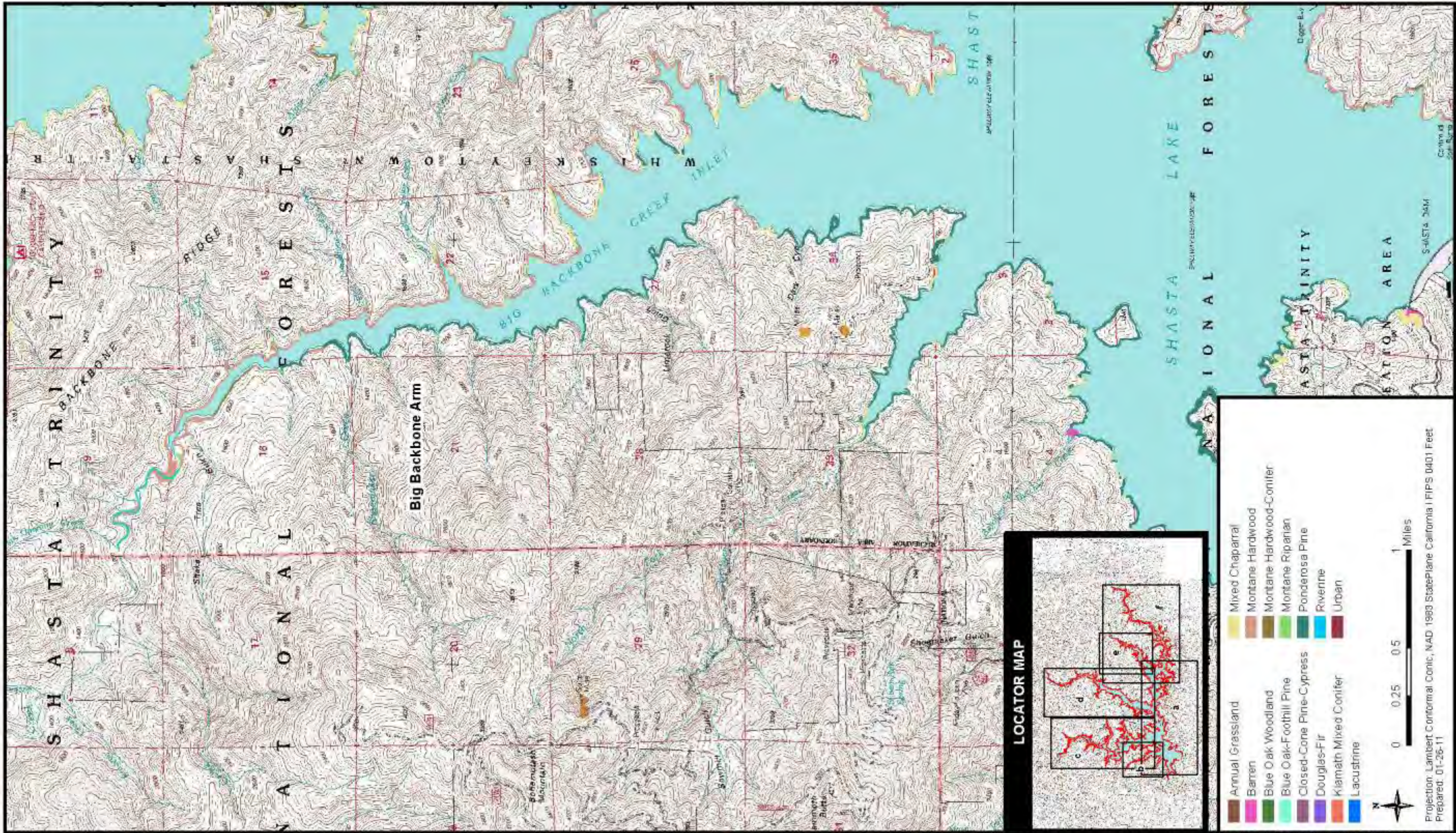


Figure 1-3b. California Wildlife Habitat Relationship Types



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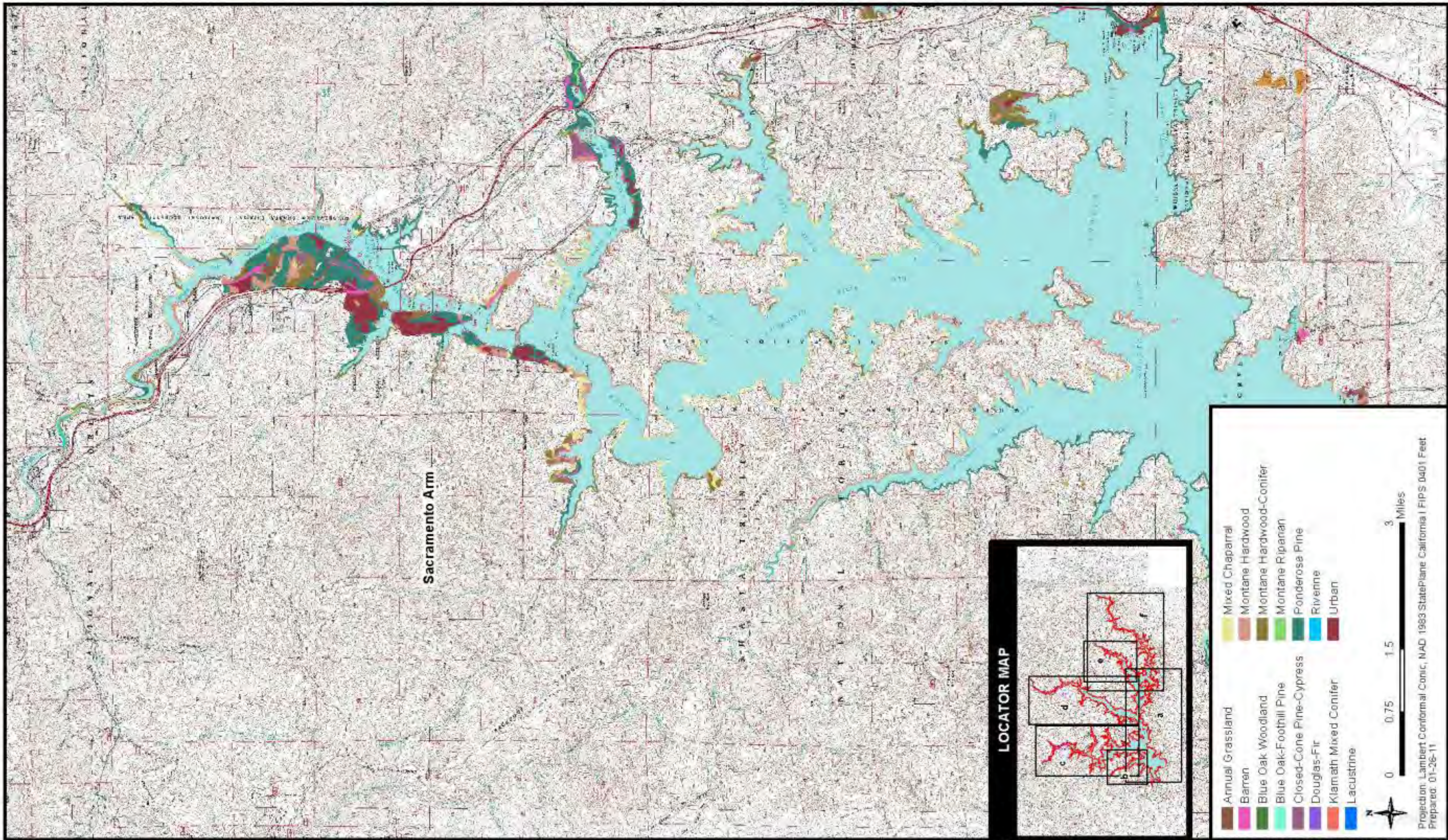


Figure 1-3c. California Wildlife Habitat Relationship Types



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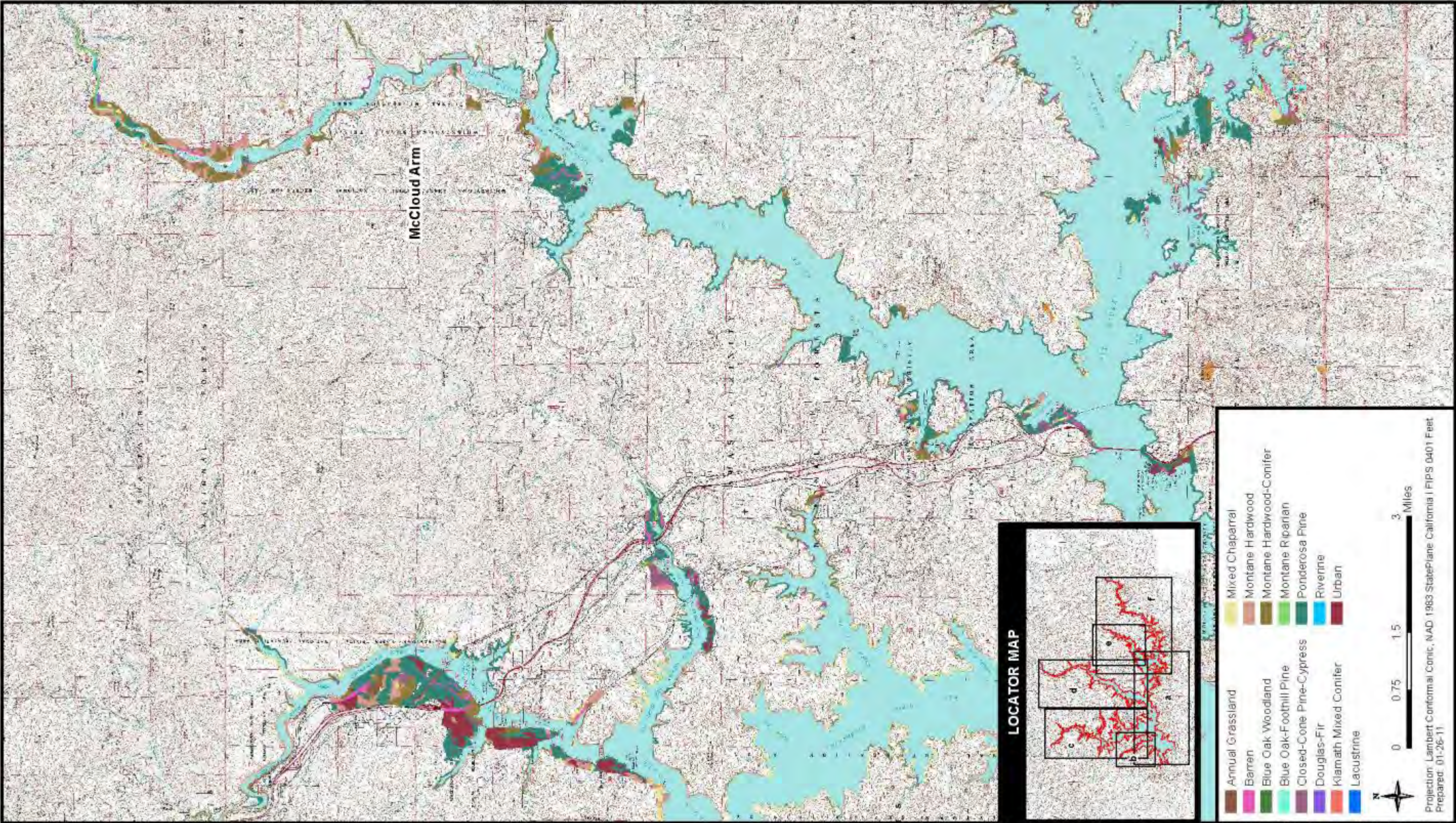
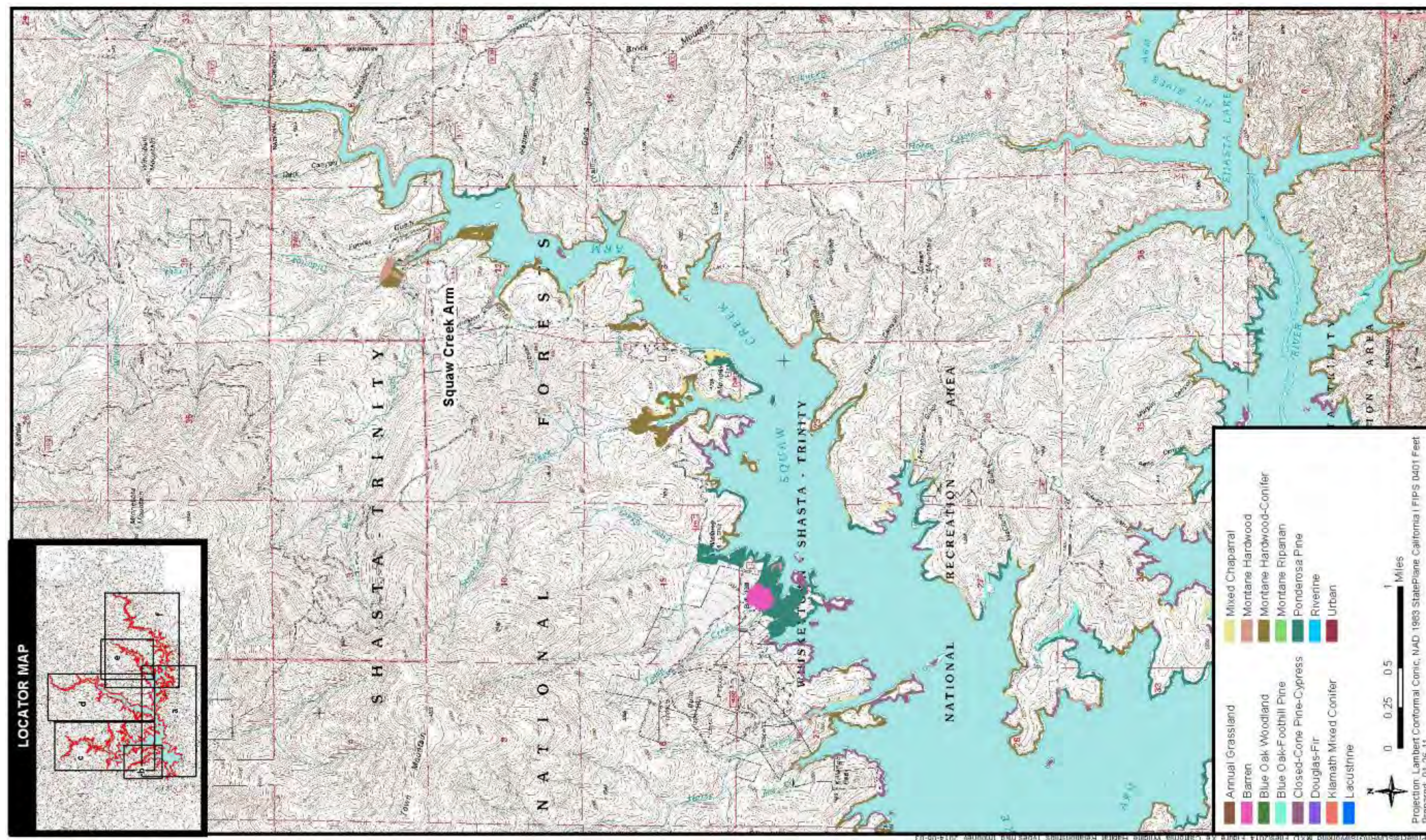


Figure 1-3d. California Wildlife Habitat Relationship Types



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**Figure 1-3e. California Wildlife Habitat Relationship Types**



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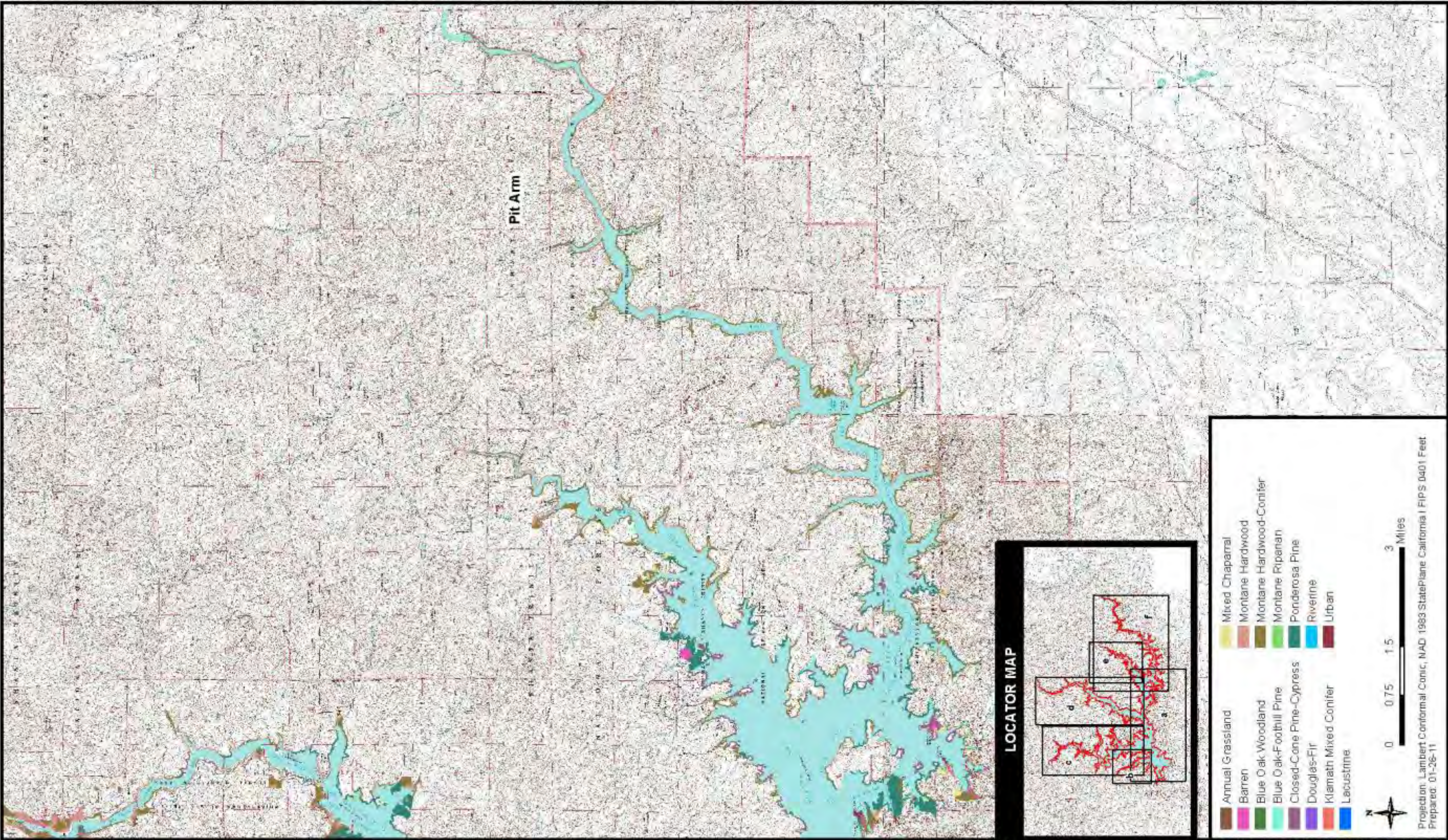


Figure 1-3f. California Wildlife Habitat Relationship Types



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**Annual Grassland** Annual grassland is uncommon in the Shasta Lake and vicinity portion of the primary study area and occurs as small inclusions in other more prevalent plant series types or in areas subjected to previous disturbance. Dominant species include wild oat (*Avena fatua*), cheatgrass (*Bromus tectorum*), ripgut (*B. diandrus*), yellow star-thistle (*Centaurea solstitialis*), squirreltail (*Elymus elymoides*), and European hairgrass (*Aira caryophyllea*). Grassland bird species such as the mourning dove (*Zenaida macroura*), savannah sparrow (*Passerculus sandwichensis*), and white-crowned sparrow (*Zonotrichia leucophrys*), as well as rodents such as the California ground squirrel (*Spermophilus beecheyi*), Botta's pocket gopher (*Thomomys bottae*), and deer mouse (*Peromyscus maniculatus*), may forage on the seed crop this community provides. These species, in turn, attract predators such as the gopher snake (*Pituophis melanoleucus*), American kestrel (*Falco sparverius*), red-tailed hawk (*Buteo jamaicensis*), and coyote. Reptile species expected to inhabit this area include the western fence lizard (*Sceloporus occidentalis*), western skink (*Eumeces skiltonianus*), western rattlesnake (*Crotalus viridis*), and yellow-bellied racer (*Coluber constrictor*).

**Barren** Barren habitat consists mainly of nonvegetated human-made features scattered throughout the Shasta Lake and vicinity portion of the primary study area, including boat ramps, parking lots, and roads. Other barren habitats include a large gravel plain feature at the confluence of Butcher Creek and Shasta Lake (Main Body) and a sealed riprap feature adjacent to Interstate 5 (I-5) near the upper Sacramento Arm and Shasta Lake confluence. Vegetation is usually not present, although sparse opportunistic grasses/forbs or weedy species may be present. Barren habitat has limited value for wildlife; however, many species in adjacent habitats may use these areas occasionally as opportunities arise, such as for feeding. Also, open nesting species such as killdeer (*Charadrius vociferus*) may use some barren surfaces for nesting.

**Blue Oak Woodland** Blue oak woodland occurs mainly as small inclusions within other more prevalent habitats; however, moderate-sized stands also occur. This habitat occurs at scattered locations along the Main Body, McCloud Arm, and Pit Arm. Blue oak woodland is characterized by a moderate overstory of blue oak (*Quercus douglasii*) with a dense herbaceous understory. Oak woodlands produce acorns used as forage by a variety of species, including acorn woodpeckers (*Melanerpes formicivorus*), western scrub-jays (*Aphelocoma californica*), turkey (*Meleagris gallopavo*), western gray squirrels (*Sciurus griseus*), and black-tailed deer (*Odocoileus hemionus columbianus*). Snags and live trees containing cavities provide nesting habitat for species such as the western bluebird (*Sialia mexicana*), tree swallow (*Tachycineta bicolor*), American kestrel, and northern flicker (*Colaptes auratus*), as well as roost sites for bats and denning sites for mammals such as the raccoon, Virginia opossum (*Didelphis virginiana*), and gray fox (*Urocyon cinereoargenteus*). Raptors, including the red-tailed hawk and great horned owl, also nest in these woodlands. Amphibian and reptile species found here include the Pacific chorus frog (*Pseudacris regilla*), bullfrog (*Rana catesbeiana*), western fence lizard,

southern alligator lizard (*Elgaria multicarinata*), western terrestrial garter snake (*Thamnophis elegans*), common garter snake (*Thamnophis sirtalis*), and western rattlesnake.

**Blue Oak-Foothill Pine** Blue oak-foothill pine habitat also occurs mainly as small inclusions within other more prevalent habitats in the Shasta Lake and vicinity portion of the primary study area; however, moderate-sized stands also occur. This habitat is found in the Main Body, Squaw Creek Arm, and Pit Arm. Species composition is similar to the blue oak woodland habitat; however, gray pine and a shrub component are more common. Dominant overstory species include blue oak, California black oak (*Quercus kelloggii*), valley oak (*Q. lobata*), interior live oak (*Q. wislizenii*), and gray pine (*Pinus sabiniana*). Common shrubs observed in this habitat include white leaf manzanita (*Arctostaphylos viscida*), buck brush (*Ceanothus cuneatus*), poison oak (*Toxicodendron diversilobum*), coffee berry (*Rhamnus californica*), snowdrop bush (*Styrax officinalis*), wild mock orange (*Philadelphus lewisii*), deer brush (*Ceanothus integerrimus*), and California buckeye (*Aesculus californica*). Common grasses and forbs observed in this vegetation habitat include pussy ears (*Calochortus tolmiei*), Pacific hounds tongue (*Cynoglossum grande*), slender wild oat, and soaproot (*Chlorogalum pomeridianum*). Lianas of Dutchman's pipe (*Aristolochia californica*) and chaparral clematis (*Clematis lasiantha*) shroud shrubs and often grow into the tree canopy.

The blue oak-foothill pine community provides breeding habitat for a large variety of wildlife species, although no species is completely dependent on it for breeding, feeding, or cover. Many of the species found in blue oak habitat are also found here. Acorns and gray pine seeds are an important resource for many of the species using this habitat, such as the acorn woodpecker, western scrub-jay, and western gray squirrel. The newly emerged leaves of oaks in the spring support an abundance of insects that attract migrating and nesting warblers, vireos, flycatchers, and other insectivorous birds. In addition, the shrubs provide habitat for birds such as the spotted towhee (*Pipilo maculatus*), California towhee (*Pipilo crissalis*), wrentit (*Chamaea fasciata*), and blue-gray gnatcatcher (*Poliophtila caerulea*). Characteristic reptiles and amphibians include western toads (*Bufo boreas*), a wide variety of snakes (common garter snakes, California whipsnakes (*Masticophis lateralis*), gopher snakes, and western rattlesnakes), western skinks, southern alligator lizards, and western fence lizards.

**Closed-Cone Pine-Cypress** Closed-cone pine-cypress consists of open to dense knobcone pine (*Pinus contorta*) stands. This habitat is scattered throughout all portions of the Shasta Lake and vicinity portion of the primary study area and often occurs in disturbed areas, including areas subject to wildfires and historic mining activities. Dominant species include knobcone pine, with occasional canyon live oak (*Quercus chrysolepis*), California black oak, ponderosa pine, and gray pine. The shrub layer is moderate to dense and is dominated by white leaf manzanita and poison oak. The ground layer varies and is dominated by various grasses and forbs. Numerous game and nongame

species make use of this habitat for feeding and cover. Steller's jays (*Cyanocitta stelleri*) and western scrub-jays, downy woodpeckers (*Picoides pubescens*), and western gray squirrels extract seeds from partially opened cones. The great horned owl and red-tailed hawk are among the few species known to use this habitat for breeding.

*Douglas-Fir* As a habitat type, Douglas-fir is uncommon in the Shasta Lake and vicinity portion of the primary study area. This habitat type occurs in the upper portion of the McCloud Arm. Douglas-fir is characterized by moderate to dense conifer stands dominated by Douglas-fir (*Pseudotsuga menziesii*), with occasional ponderosa pine (*Pinus ponderosa*), sugar pine (*P. lambertiana*), incense cedar (*Calocedrus decurrens*), canyon live oak, and California black oak. Associated understory species vary and include Pacific dogwood (*Cornus nuttallii*), mock orange (*Philadelphus lewisii*), poison oak, snowdrop bush, and white leaf manzanita. The ground layer ranges from open to moderate and is dominated by various grasses and forbs. The multilayered vegetation in the Douglas-fir community supports a variety of wildlife species. A significant feature of the community is the presence of cavity-bearing trees. Mature, fire-damaged, and wind-damaged forests typically contain snags (dead trees that are still standing), which are a valuable resource for birds and mammals that prefer nest and den sites in cavities, such as the flammulated owl (*Otus flammeolus*) and northern pygmy owl (*Glaucidium gnoma*). Snags also support wood-boring insects that provide food for bark-gleaning insectivorous birds such as the brown creeper (*Certhia americana*). Other birds foraging and/or breeding in this habitat include the sharp-shinned hawk (*Accipiter striatus*), American peregrine falcon, mountain quail, western wood-pewee (*Contopus sordidulus*), and western tanager (*Piranga ludoviciana*). Mammals found in this habitat include the long-eared myotis (*Myotis evotis*), western red bat (*Lasiurus blossevillei*), northern flying squirrel (*Glaucomys sabrinus*), and bobcat (*Lynx rufus*).

*Klamath mixed conifer* Klamath mixed conifer is an uncommon habitat type in the Shasta Lake and vicinity portion of the primary study area. This habitat type occurs in the upper portion of the Pit Arm, and in scattered locations in the watershed above the Shasta Lake and vicinity portion of the primary study area. Klamath mixed conifer is characterized by conifer stands dominated by Douglas-fir, ponderosa pine, sugar pine, with occasional incense cedar. Dominant hardwoods include canyon live oak, California black oak, and Pacific madrone (*Arbutus menziesii*). Associated understory species vary and include Pacific dogwood, mock orange, poison oak, and snowberry (*Symphoricarpos* sp.). The ground layer ranges from open to moderate and is dominated by various grasses and forbs. These forest stands are generally complex structurally, tend to grow on cooler northerly aspect slopes, and support similar wildlife species as the Douglas-fir habitat.

*Lacustrine* Lacustrine habitat consists of the area regularly inundated by Shasta Lake (i.e., areas up to and below the 1,070-foot elevation). Most of this area is barren of vegetation and is characterized as exposed soil and/or rock.

Portions of the lacustrine habitat do support vegetation during draw-down periods, including woody riparian species such as black willow, button willow, Fremont cottonwood, and various grasses and forbs.

*Mixed Chaparral* Mixed chaparral is a common habitat type and is scattered throughout all portions of the Shasta Lake and vicinity portion of the primary study area. This habitat often occurs on exposed slopes and/or in disturbed areas, including areas subject to wildfires and historic mining activities. Mixed chaparral is typically characterized by dense shrub stands dominated by white leaf manzanita, buck brush, toyon (*Heteromeles arbutifolia*), California buckeye, Brewer's oak (*Quercus garryana* var. *breweri*), California bay (*Umbellularia californica*), interior live oak, Lemmon's ceanothus (*Ceanothus lemmonii*), birch-leaf mountain mahogany (*Cercocarpus betuloides*), holly-leaf redberry (*Rhamnus ilicifolia*), yerba santa (*Eriodictyon californicum*), and poison oak. Few herbaceous plants occur in this habitat. Mixed chaparral provides habitat for a wide variety of wildlife species. It provides seeds, fruit, and protection from predators and harsh weather. In addition, it provides singing, roosting, and nesting sites for many species of birds, including the California quail (*Callipepla californica*), wrentit, and Bewick's wren (*Thryomanes bewickii*). Mammals common in this habitat include the black-tailed hare (*Lepus californicus*), gray fox, coyote, and deer mouse. Reptiles that make use of this habitat include the western fence lizard and southern alligator lizard.

*Montane Hardwood* Montane hardwood is a common tree habitat type and is scattered throughout all portions of the Shasta Lake and vicinity portion of the primary study area. The montane hardwood stands are typically characterized by moderate to dense stands of California black oak, canyon live oak, and occasional interior live oak. The understory is variable, although often sparse in the evergreen (live oak) stands because of a typically dense overstory canopy. Mast crops provided by montane hardwood forests are an important food resource for many species, including the acorn woodpecker, Steller's jay, mountain quail (*Oreortyx pictus*), western gray squirrel, and black-tailed deer. In addition, cavities in mature trees provide nesting and denning habitat for species such as the northern flicker, western screech owl (*Otus kennicottii*), American kestrel, and Virginia opossum. In moist areas, many amphibians and reptiles are found in the duff layer, including ensatina (salamander) (*Ensatina eschscholtzii*) and western skink.

*Montane Hardwood-Conifer* Montane hardwood-conifer is a common tree habitat type and is scattered throughout all portions of the Shasta Lake and vicinity portion of the primary study area. Montane hardwood-conifer is a complex forest type generally characterized by a complex of hardwood and conifer tree species. Stand composition varies, depending on numerous physical and geographic factors, and can include California black oak, canyon live oak, interior live oak, Oregon white oak (*Quercus garryana*), gray pine, ponderosa pine, Douglas-fir, sugar pine, and knobcone pine. Understory species are generally moderate to dense and include white leaf manzanita, buck brush,

California buckeye, western redbud (*Cercis occidentalis*), California bay, poison oak, birch-leaf mountain mahogany, Brewer's oak, and snowdrop bush. The ground layer varies and is dominated by various grasses and forbs, including pussy ears, soaproot, Pacific hound's tongue, and slender wild oat.

The variability of the canopy cover and understory vegetation makes montane hardwood-conifer habitat suitable for numerous species of wildlife. Hollow trees and logs provide denning sites for mammals such as the coyote and gray fox, and cavities in mature trees are used by cavity-dwelling species such as the acorn woodpecker, violet-green swallow (*Tachycineta thalassina*), northern flicker, great horned owl, raccoon, and California myotis (*Myotis californicus*). In addition, raptors, such as the red-tailed hawk, construct nests in the upper canopy of mature trees. Moreover, mast crops and conifer seeds are an important food source for many birds and mammals, including the Steller's jay, acorn woodpecker, California quail, black-tailed deer, and western gray squirrel. In moist areas, many amphibians and reptiles, including ensatina and western fence lizards, inhabit the detrital layer. Snakes, including the western rattlesnake and sharp-tailed snake (*Contia tenuis*), also are found in this habitat.

*Montane Riparian* Montane riparian is the dominant riparian habitat type and is scattered throughout all portions of the Shasta Lake and vicinity portion of the primary study area. Montane riparian habitat occurs as thin stringers and large patches along most stream corridors and is characterized as a sparse overstory of white alder (*Alnus rhombifolia*), Fremont cottonwood (*Populus fremontii*), or big leaf maple (*Acer macrophyllum*), along with a fairly dense mid-story and herbaceous layer. The mid-story is dominated by red osier dogwood (*Cornus sericea*), arroyo willow (*Salix lasiolepis*), narrow-leaved willow (*S. exigua*), red willow (*S. laevigata*), spicebush (*Calycanthus occidentalis*), mock orange, button willow (*Cephalanthus occidentalis*), American dogwood (*Cornus cericea*), California ash (*Fraxinus dipetala*), and mugwort (*Artemisia douglasiana*). Brambles of Himalayan blackberry (*Rubus discolor*) and California blackberry (*R. ursinus*) often engulf broader, low-gradient riparian areas. Lianas including California grape and greenbriar (*Smilax californica*) grow into the canopy.

Riparian habitats are among the most important wildlife habitats because of their high floristic and structural diversity, high biomass (and therefore high food abundance), and high water availability. In addition to providing breeding, foraging, and roosting habitat for a diverse array of animals, riparian habitats also provide movement corridors for some species, connecting a variety of habitats throughout the region.

The leaf litter, fallen tree branches, and logs associated with the riparian community in the study area provide cover for the western toad and Pacific chorus frog. The western fence lizard, western skink, and southern alligator lizard are also expected to occur here. Common species nesting and foraging primarily in the riparian tree canopy include the bushtit (*Psaltiriparus minimus*),

white-breasted nuthatch (*Sitta carolinensis*), and Nuttall's woodpecker (*Picoides nuttallii*). Other resident species, such as the spotted towhee and song sparrow (*Melospiza melodia*), nest and forage on or very close to the ground, usually in dense vegetation. A variety of mammals also inhabit riparian communities, including the deer mouse, raccoon, Virginia opossum, and several bat species.

**Ponderosa Pine** Ponderosa pine is the most common conifer habitat type in the Shasta Lake and vicinity portion of the primary study area and is scattered throughout all portions of the area. This habitat is characterized by open to dense conifer stands dominated by ponderosa pine. Associated species include occasional Douglas-fir, sugar pine, incense cedar, canyon live oak, and California black oak. Associated understory species vary and include redbud, buck brush, mock orange, poison oak, snowdrop bush, and white leaf manzanita. The ground layer ranges from open to moderate and is dominated by various grasses and forbs.

Ponderosa pine needles, cones, buds, pollen, twigs, seeds, and associated fungi and insects provide food for many species of birds and mammals, including the mountain quail, western gray squirrel, black-tailed deer, Allen's chipmunk (*Tamias senex*), and black bear (*Ursus americanus*). Mature trees provide nesting habitat for raptors such as the bald eagle (*Haliaeetus leucocephalus*), osprey (*Pandion haliaetus*), sharp-shinned hawk, and red-tailed hawk, and snags and hollow logs provide shelter for species such as the Virginia opossum, western spotted skunk (*Spilogale gracilis*), and several bat species.

**Riverine** Riverine habitat includes the free-flowing portions of the larger Shasta Lake tributaries in the Shasta Lake and vicinity portion of the primary study area. The riverine habitat is highly variable and ranges from moderately to well-confined stream reaches with low to steep gradient. Most riverine habitat is dominated by run-and-riffle habitats, with bedrock, boulder, cobble, gravel, and sand substrates. The vegetation in the active stream channel is sparse, with occasional clumps of torrent sedge (*Carex nudata*) and Indian rhubarb (*Darmera peltata*).

Riverine areas provide habitat for numerous fish, including rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), smallmouth bass (*Micropterus dolomieu*), and riffle sculpin (*Cottus gulosus*). Aquatic wildlife species include the foothill yellow-legged frog (*Rana boylei*), aquatic garter snake (*Thamnophis atratus*), and the aquatic phase of the rough-skinned newt (*Taricha granulosa granulosa*). Birds present include the American dipper (*Cinclus mexicanus*), common merganser (*Mergus merganser*), and belted kingfisher (*Ceryle alcyon*). Many mammals in the surrounding upland habitats use the riverine areas, including raccoon, gray fox, black-tailed deer, and many bat species.

*Urban* Urban habitat consists of various human-made features scattered throughout the Shasta Lake and vicinity portion of the primary study area, including resorts and a portion of the visitor center complex at Shasta Dam. These features are typically a combination of buildings, pavement areas with manicured landscaping, and lawns. The wildlife species most often associated with urban areas are those that are most tolerant of periodic human disturbances, including several introduced species, such as European starling (*Sturnus vulgaris*), rock dove (*Columba livia*), and house mouse (*Mus musculus*). Native species that are able to use these habitats include the western fence lizard, American robin (*Turdus migratorius*), Brewer's blackbird (*Euphagus cyanocephalus*), northern mockingbird (*Mimus polyglottos*), mourning dove, house finch (*Carpodacus mexicanus*), California ground squirrel, black-tailed hare, and striped skunk (*Mephitis mephitis*). In addition, bats that forage in nearby habitats may make use of small cavities around the eaves of structures.

**Upper Sacramento River (Shasta Dam to Red Bluff)** The following section provides a description of the wildlife habitat that exist along the Sacramento River throughout the primary study area, and a detailed discussion of potential Sacramento River downstream habitat restorations areas.

The variety and availability of habitats along the Sacramento River between Shasta Dam and RBPP support a variety of waterfowl, raptors, and migratory and resident avian species, plus a variety of mammals, amphibians, and reptiles that inhabit aquatic, riparian, and upland habitats. The high diversity and abundance of animals is also caused by the presence of large tracts of land covered by habitats known to have outstanding value for wildlife, such as riparian woodland, oak woodland, marsh, and grassland. Important wildlife habitat is found throughout the upper Sacramento River portion of the primary study area, and large contiguous blocks that contain multiple habitat types have the potential to support the highest wildlife diversity and abundance. Generally, the lowest diversity of native wildlife species can be expected in densely urbanized areas. Special-status wildlife occurs in both large and small blocks of habitat, while some large mammals and secretive species are generally found only on large undisturbed parcels. Overall, however, the quantity and variety of wildlife species now inhabiting the area are fewer than before agricultural and residential development permanently removed much of the native and natural habitat. Most affected have been wildlife species associated with riparian and grassland habitats, which have been highly altered by land use, water resources development, and land management practices. Many of the wildlife species are unable to adapt to other habitat types or altered habitat conditions and are, therefore, susceptible to habitat loss and degradation. The region also supports a variety of nonnative plant and animal species, some of which are detrimental to survival of native species.

Riparian habitats are considered to be among the most productive wildlife habitats in California and typically support the most diverse wildlife

communities. In addition to providing important nesting and foraging habitat, riparian habitats function as wildlife movement corridors. Riparian habitat has been designated by the California Department of Fish and Wildlife (CDFW, formerly known as California Department of Fish and Game (CDFG)) as a sensitive habitat in California because of its limited abundance and high value to wildlife.

*Riparian Woodland* Riparian woodlands along the upper Sacramento River are composed of the cottonwood willow riparian and valley oak riparian land cover types. The composition of dominant species differs between these two land cover types, but the riparian tree species provide similar functions and values for wildlife. Although riparian woodlands along the upper Sacramento River typically occur in narrow or discontinuous patches, this cover type provides important value for wildlife and supports a great abundance of both common and listed species of birds, mammals, reptiles, amphibians, and invertebrates. Aside from ornamental or landscape trees associated with farms or isolated trees in fields and along roadsides, riparian woodlands provide the only overstory and midstory vegetation. Overstory trees may be used for nesting and roosting by numerous raptors, including Swainson's hawk (*Buteo swainsoni*), white-tailed kite (*Elanus leucurus*), red-tailed hawk (*Buteo jamaicensis*), barn owl (*Tyto alba*), great horned owl (*Bubo virginianus*), and American kestrel (*Falco sparverius*). Riparian woodlands also provide important nesting and foraging cover for resident, migratory, and wintering songbirds, and they support several species of mammals and provide cover and foraging habitat for reptiles and amphibians. Elderberry shrubs, which provide habitat for the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), also may be associated with this community type.

*Riparian Scrub* Riparian scrub occurs throughout the upper Sacramento River portion of the primary study area. Riparian scrub is composed of three land cover types: riparian scrub, willow scrub, and stands of giant reed. Riparian scrub habitat provides value for wildlife similar to riparian woodland; however, riparian scrub habitat lacks an overstory component. Although riparian scrub habitat typically occurs in narrow or discontinuous patches, this cover type provides important food, shelter, and breeding habitat for wildlife.

*Oak Woodland* The widely scattered but sparsely occurring Valley oak woodlands are dominated by valley oaks, but include the following associated trees: California sycamore (*Platanus racemosa*), California black walnut (*Juglans californica*), California box elder (*Acer negundo californicum*), Oregon ash (*Fraxinus latifolia*), interior live oak, California buckeye, and blue oak. At lower elevations closer to water, the valley oak is also associated with Fremont cottonwood and tree willows. Oak and other hardwood habitats at low and middle elevations are important for many wildlife species found along the upper Sacramento River. Oak woodland is one of the most biologically diverse communities in California (Allen-Diaz et al. 2007). Oaks provide shelter, through shading and within trunk cavities, for a variety of wildlife in an



otherwise open, dry landscape, including a variety of birds (e.g., American kestrel, owls, northern flicker, northern goshawk (*Accipiter gentilis*), sharp-shinned hawk, and white-tailed kite) and small rodents (e.g., chipmunks, deer mice, pocket mice (*Perognathus* sp.), and squirrels). The oaks also provide roost sites for a variety of bats and denning sites for mammals such as the raccoon (*Procyon lotor*), Virginia opossum, ringtail (*Bassariscus astutus*), and gray fox. Large acorn crops and a diverse insect and small mammal fauna provide high-quality food for a wide variety of amphibians, reptiles, birds, and mammals, including a variety of salamanders (*Aneides* sp. and *Batrachoseps* sp.), kingsnakes (*Lampropeltis* sp.), garter snakes, rattlesnakes (*Crotalus* sp.), skinks, acorn and other varieties of woodpeckers, warblers, vireos, flycatchers, Cooper's hawk (*Accipiter cooperii*), wild turkey, and mule deer (*Odocoileus hemionus*).

**Chaparral** Chaparral communities are characterized by dense cover of drought-tolerant shrubs; they typically occur on dry, rocky, thin-soiled slopes that are often steep and have southern aspects. Chaparral generally has lower wildlife diversity than most forest and woodland habitats. However, chaparral does provide habitat for many wildlife species, including some that are considered rare elsewhere. Reptiles found in chaparral include western rattlesnake (*Crotalus viridis*), western fence lizard (*Sceloporus occidentalis*), and western whiptail (*Cnemidophorus tigris*). Common birds in chaparral at low elevations include California thrasher (*Toxostoma redivivum*) and California quail (*Callipepla californica*). The general trend toward more dense underbrush in foothill habitats, resulting from fire suppression, has favored species that rely on dense vegetation for cover or foraging while negatively affecting raptors and other wildlife that require open areas for foraging.

**Annual Grassland** Annual grasslands generally support lower wildlife diversity than woodland and shrub-dominated habitats but are invaluable to the number of grassland-dependent species found in the upper Sacramento River portion of the primary study area. A great diversity and abundance of mammals, birds, and insects rely on grasslands. The grasslands also support vernal pools and other seasonal wetlands that provide unique habitat for waterfowl, various small aquatic organisms, and breeding habitat for amphibians. Vernal pools are ephemeral communities that support an unusual flora and fauna specifically adapted to ponding during the wet season and dry conditions during summer. This circumstance is reflected by the high number of species that are endemic to vernal pools.

**Agriculture** Conversion of grasslands to agricultural land has favored species that have adapted to the use of agricultural fields for foraging and species that can thrive in the altered landscape. Agricultural land is not generally considered important wildlife habitat but is used by many species, particularly as foraging habitat. Wildlife found in agricultural areas varies depending upon crop type and time of year. Agricultural lands include upland cropland and seasonally flooded cropland (land that requires seasonal flooding for at least 1 week at a

time as a management practice (e.g., pest control or irrigation) or to enhance habitat values for specific wildlife, particularly waterfowl). Agricultural lands, both those that are and those that are not seasonally flooded, support foraging habitat for many birds, such as Swainson's hawks, as well as garter snakes (*Thamnophis* spp.), and support other species that have adapted or thrived in the modified human environment, including coyote (*Canis latrans*), raccoon (*Procyon lotor*), and American crow (*Corvus brachyrhynchos*).

**Urban** Urbanized landscapes also can support many wildlife species that are adapted to disturbed environments. Wildlife found in urban areas often depends on surrounding land uses and the presence or absence of nearby natural vegetation. In densely urbanized areas, a large percentage of the wildlife can be made up of exotic species. Urban areas provide habitat for species also found in agricultural areas such as mourning dove (*Zenaida macroura*), American robin (*Turdus migratorius*), and western gray squirrel (*Sciurus griseus*).

**Potential Sacramento River Downstream Habitat Restoration Areas** The potential Sacramento River downstream habitat restoration areas are characterized by habitats typical of riparian and riverine areas found in Sacramento River below Shasta Dam. These habitats were also mapped and classified using the WHR. Habitats present in the potential Sacramento River downstream habitat restoration areas are summarized in Table 1-4, and depicted in Figures 1-4a through 1-4f. General habitat descriptions for these locations are also described below.

**Table 1-4. Summary of Wildlife Habitats in the Potential Sacramento River Downstream Habitat Restoration Areas**

Habitat	Area (acres*)						Total
	Henderson	Tobiasson Island	Shea Island Complex	Kapusta Island	Anderson River Park	Reading Island	
Annual grassland	2.50	13.73	2.61	18.15	7.83	0.00	44.82
Barren	0.31	1.10	0.00	0.00	0.55	0.00	1.96
Freshwater emergent wetland	3.73	0.28	0.54	0.43	11.05	15.33	31.36
Mixed chaparral	0.00	0.00	0.00	0.00	2.80	0.00	2.80
Orchard	0.00	0.00	0.00	0.00	0.00	0.55	0.55
Riverine	0.66	1.33	3.45	8.07	0.00	0.47	13.98
Valley-foothill riparian	13.12	9.06	28.97	25.08	57.90	24.78	158.90

**Table 1-4. Summary of Wildlife Habitats in the Potential Sacramento River Downstream Habitat Restoration Areas (contd.)**

Habitat	Area (acres*)						Total
	Henderson	Tobiasson Island	Shea Island Complex	Kapusta Island	Anderson River Park	Reading Island	
Valley oak woodland	0.00	13.26	0.00	13.33	26.85	50.48	103.92
Total	20.32	38.76	35.57	65.06	106.96	91.61	358.29

Note:

\*Acreage values are approximate.

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Figure 1-4a. California Wildlife Habitat Relationship Types – Henderson Open Space



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Figure 1-4b. California Wildlife Habitat Relationship Types – Tobiasson Island

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Figure 1-4c. California Wildlife Habitat Relationship Types – Shea Island Complex



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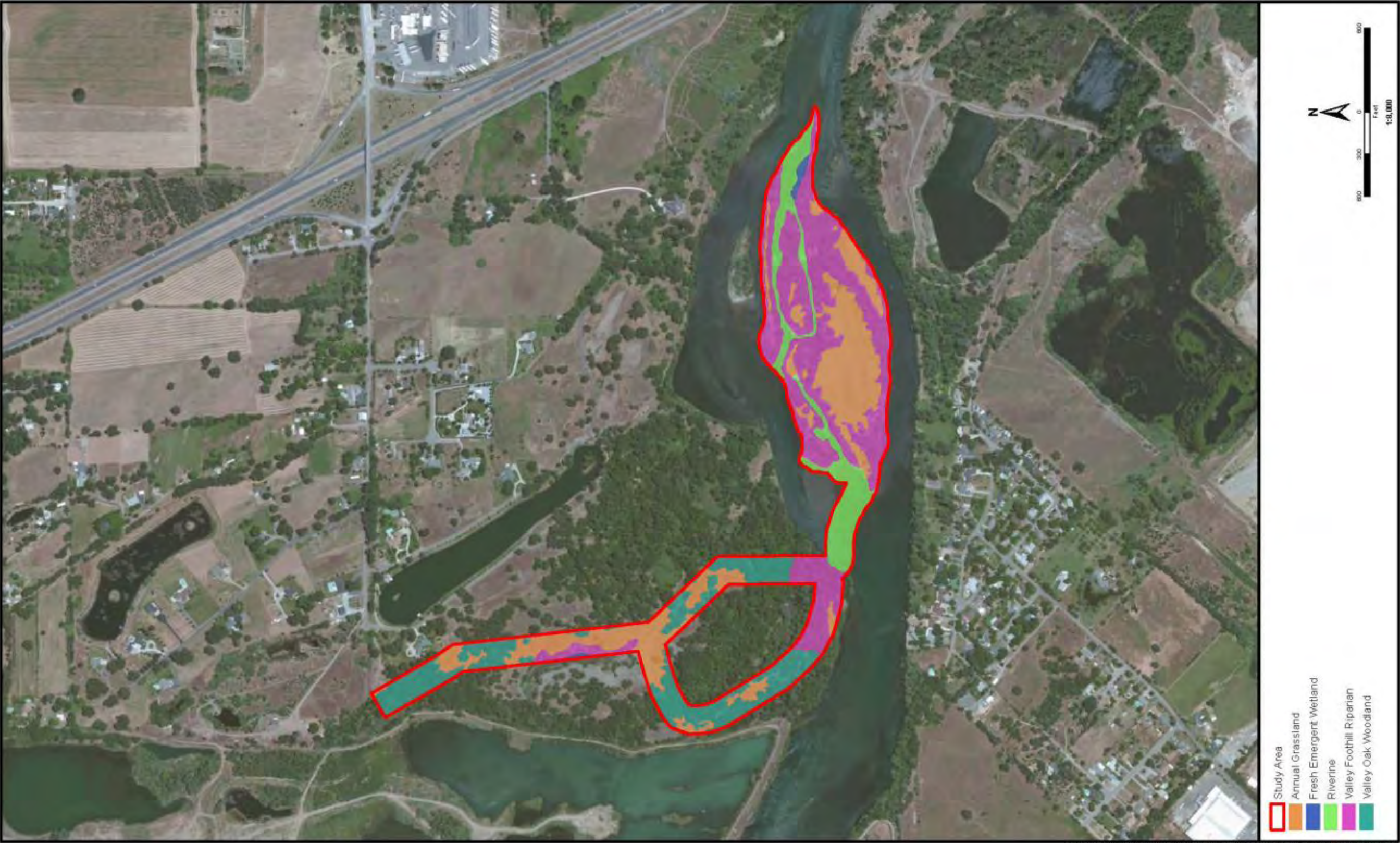


Figure 1-4d. California Wildlife Habitat Relationship Types – Kapusta Island



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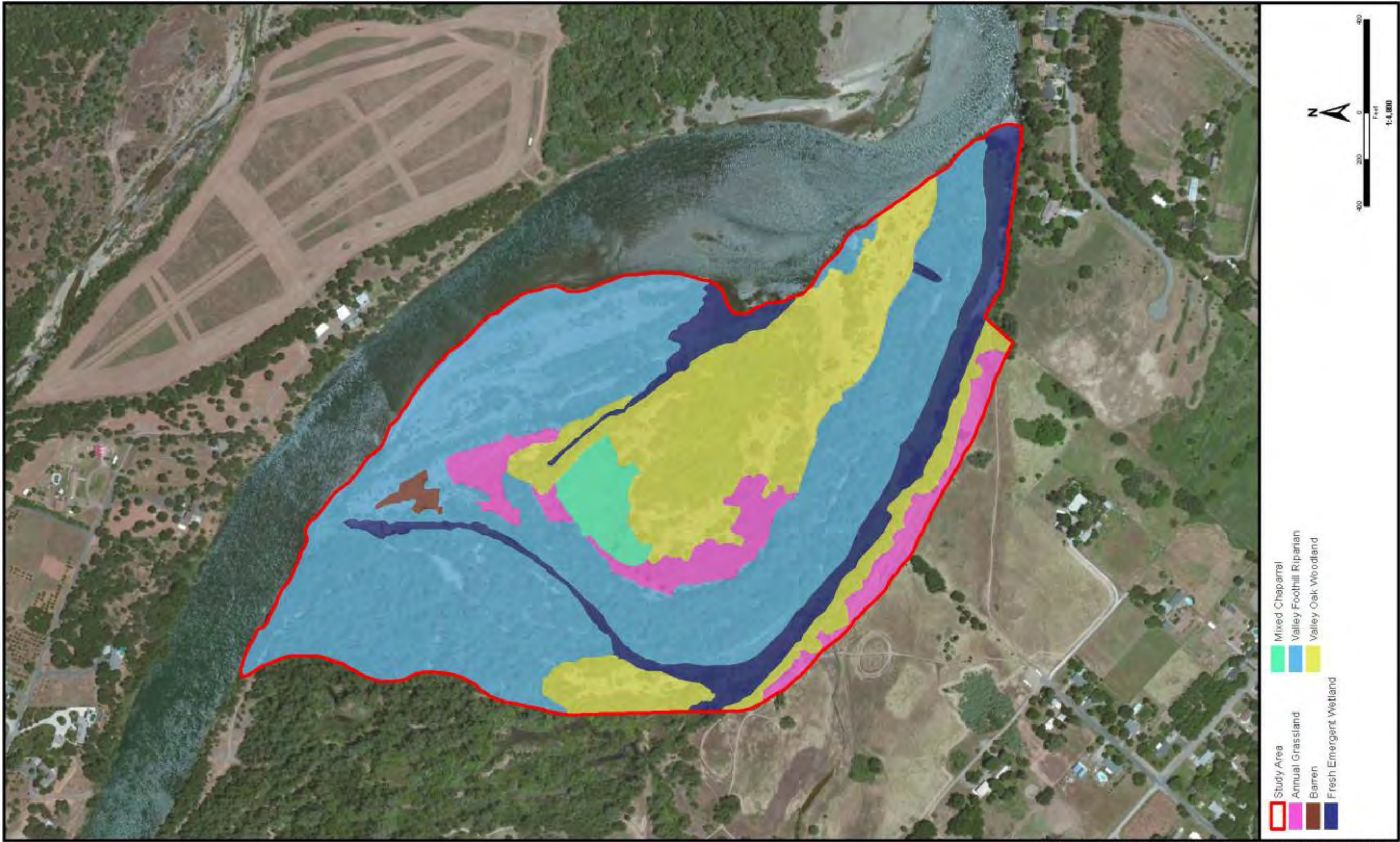


Figure 1-4e. California Wildlife Habitat Relationship Types – Anderson River Park

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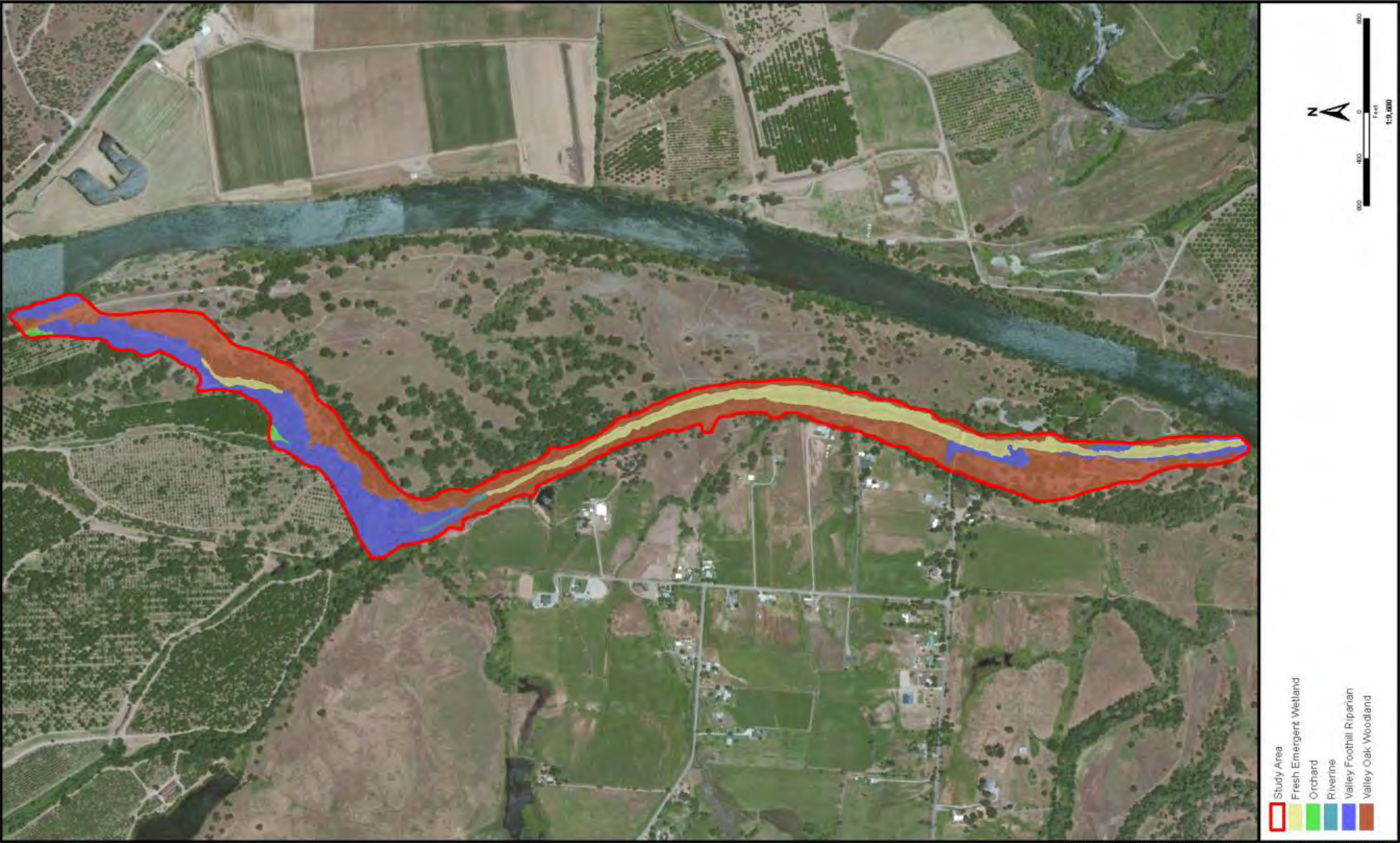


Figure 1-4f. California Wildlife Habitat Relationship Types – Reading Island

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Many of the same wildlife habitats found in the Shasta Lake and vicinity portion of the primary study area also occur in the potential Sacramento River habitat restoration areas. However, the species composition, structure, and overall function of these areas are significantly different, as these areas are situated in a separate geographic setting and region. Habitats occurring in the potential Sacramento River habitat restoration areas include annual grassland, barren, freshwater emergent wetland, mixed chaparral, riverine, valley-foothill riparian, and valley oak woodland.

*Annual grassland* Annual grasslands are uncommon in the potential Sacramento River habitat restoration areas and occur as open ruderal areas and vegetated gravel bars. This plant community is characterized by moderate to dense cover of annual grasses and forbs including black mustard (*Brassica nigra*), California poppy (*Eschscholzia californica*), ripgut grass (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), wild oat (*Avena barbata*), rose clover (*Trifolium hirtum*), long beaked storks bill (*Erodium botrys*), turkey mullein (*Croton setigeris*), Oregon golden aster (*Heterotheca oregona*), and tall sock-destroyer (*Torilis arvensis*).

*Barren* Barren habitat occurs on gravel bars and is characterized by open areas of gravel and cobble substrates. Vegetation is typically absent, although in some barren areas sparse opportunistic grasses/forbs or weedy species may occur.

*Freshwater emergent wetland* Freshwater emergent wetlands occur along the margins of backwater sloughs and other wetland features, and as small inclusions in valley-foothill riparian habitats. These wetlands are characterized by dense stands of broadleaf cattail (*Typha latifolia*), with reed canarygrass (*Phalaris arundinacea*), horsetail (*Equisetum* sp.), smartweed (*Persicaria* sp.), sedges (*Carex* spp.), rushes (*Juncus* spp.), and dallisgrass (*Paspalum dilatatum*). Submergent vegetation dominated by parrot's feather (*Myriophyllum aquaticum*) and water primrose (*Ludwigia peploides*) grow in the deep water portions of the wetlands.

*Mixed chaparral* Mixed chaparral is uncommon in the potential Sacramento River habitat restoration areas and only occurs at the Anderson River Park site. This habitat consists of shrub patches in open rocky areas in the central portion of the study area dominated by California yerba santa (*Eriodictyon californicum*) and wright's buckwheat (*Eriogonum wrightii*). Other associated species include Oregon golden aster, naked buckwheat (*Eriogonum nudum*), slender wild oat, mousetail, ripgut grass, soft chess, and red brome (*Bromus madritensis* ssp. *rubens*).

*Orchard* Orchard habitat is uncommon in the potential Sacramento River habitat restoration areas and only occurs at the Reading Island site. This habitat consists of a small portion of a walnut orchard extending into a portion of the northern site boundary. The walnut orchard is mature and well maintained.

Vegetation includes an overstory of walnut trees and ground cover of various grasses and forbs.

*Riverine* Riverine habitat occurs at each potential Sacramento River habitat restoration area and consists of portions of active Sacramento River channel within and/or around each site. The riverbed is dominated by primarily gravel, cobble, and boulder substrates.

*Valley-foothill riparian* Valley-foothill riparian is the dominant habitat in the potential Sacramento River habitat restoration areas and occurs as moderate to dense stands of mainly riparian trees and shrubs. Many tree and shrub species occur including Fremont cottonwood (*Populus fremontii*), valley oak (*Quercus lobata*), Oregon ash (*Fraxinus latifolia*), white alder (*Alnus rhombifolia*), narrowleaf willow (*Salix exigua*), shining willow (*Salix lasiandra*), Goodding's black willow (*Salix goodingii*), black locust (*Robinia pseudoacacia*), and silver wattle (*Acacia dealbata*). Understory vegetation is moderate to dense and includes Himalayan blackberry (*Rubus armeniacus*), California grape (*Vitis californica*), Santa Barbara sedge (*Carex barbarae*), giant reed (*Arundo donax*), mugwort (*Artemisia douglasii*), horsetail, and Johnson grass (*Sorghum halepense*).

*Valley oak woodland* Valley oak woodland is uncommon in the potential Sacramento River habitat restoration areas and only occurs at the Anderson River Park site and a small portion of the Tobaisson Island site. This habitat occurs above the active flood plain of the Sacramento River and characterized by a moderate overstory of valley oak (*Quercus lobata*) with occasional interior live oak (*Quercus wislizenii*), foothill pine (*Pinus sabiniana*), narrowleaf willow, shining willow, Fremont cottonwood, Oregon ash, and tree of heaven (*Ailanthus altissima*). Dominant understory vegetation includes western redbud (*Cercis occidentalis*), California coffee berry (*Frangula californica*), mugwort, winter vetch (*Vicia villosa*), Santa Barbara sedge, ripgut grass, common ragweed (*Ambrosia artemisiifolia*), and Bermuda grass (*Cynodon dactylon*).

### **Extended Study Area**

The extended study area extends from RBPP south (downstream along the Sacramento River) to the Delta. It also includes the Bay-Delta area and portions of the American and San Joaquin River basins. This extended study area includes CVP and SWP dams and other facilities, rivers downstream from the dams that affect Sacramento River and Delta inflows, and the CVP/SWP service areas. These reservoirs and tributaries include Lake Oroville, Folsom Lake, San Luis Reservoir, New Melones Reservoir, and Trinity Lake, and portions of the Trinity, Feather, American, and Stanislaus Rivers. The CVP/SWP service areas include much of the Sacramento and San Joaquin Valleys and substantial portions of the Bay Area and of Southern California (Figure 1-5).

Most habitat types and many of the wildlife species described above for the Sacramento River corridor have the potential to occur in the CVP/SWP service



areas portion of the extended study area, with additional species occurring in upland and foothill areas. The extended study area also includes tidal aquatic environments unique to the Delta, as well as seasonally flooded agriculture.



Figure 1-5. Central Valley Project and State Water Project Service Areas



### **Lower Sacramento River and Delta**

*Sacramento River from Red Bluff Diversion Dam to the Delta* The segment of the extended study area between RBPP and the Delta includes a diverse array of wildlife habitats, including floodplains, basins, terraces, active and remnant channels, and oxbow sloughs. The variety and availability of habitats along the middle Sacramento River support a wide range of wildlife species including a variety of resident and migratory waterfowl, raptors, and songbirds, plus a variety of mammals, amphibians, and reptiles that inhabit both aquatic and upland habitats.

The mature valley oak woodland and savanna and other mature riparian forest community types provide nesting and foraging habitat for raptors, such as Swainson's hawk, white-tailed kite, red-tailed hawk, barn owl, great horned owl, and American kestrel. The riparian woodlands also function as wildlife movement corridors and provide important nesting and foraging cover for resident, migratory, and wintering songbirds; in addition, they support several species of mammals and provide cover and foraging habitat for reptiles and amphibians. Elderberry shrubs also may be associated with this community type.

Although riparian woodlands in the extended study area typically occur in narrow or discontinuous patches, this cover type provides important values for wildlife and supports a great abundance of both common and listed species of birds, mammals, reptiles, amphibians, and invertebrates.

Drought conditions and conversion of natural habitats to agricultural and urban uses have contributed to declines in the numbers of waterfowl and shorebirds using the Sacramento River region. These declines were caused by unfavorable breeding ground conditions during the late 1950s and the mid-1980s.

Waterfowl and shorebird populations recovered appreciably after these periods of decline. Today, private duck clubs and Federal and State refuges in the Sacramento River region provide essential habitat for wintering waterfowl and shorebirds in the Sacramento River region. Approximately 60 percent of the Pacific Flyway waterfowl population winters in the Sacramento River region. The Sacramento River region is particularly important to shorebirds in spring, when shorebirds use wetlands in the valley as staging areas during migration to northern breeding grounds.

Annual grasslands generally support lower wildlife diversity than woodland and shrub-dominated habitats but are invaluable to the number of grassland-dependent species found in the study area. A great diversity and abundance of mammals, insects, and birds rely on grasslands. The grasslands also support vernal pools and other seasonal wetlands that provide unique habitat for waterfowl, various small aquatic organisms, and breeding habitat for amphibians.

*Sacramento–San Joaquin River Delta* Delta wetlands are considered to be among the most productive wildlife habitats in California. These wetlands include permanent saline, brackish, and freshwater marshes; seasonal freshwater wetlands; open water; tidal and nontidal marshes and emergent wetlands; and seasonally flooded agricultural cropland, such as rice fields (CALFED 2000c).

Tule and cattail tidal emergent wetland, herein referred to as tidal emergent wetland, includes portions of the intertidal zones of the Delta that support emergent wetland plant species. Tidal emergent wetlands include all or portions of the tidal and Delta sloughs, and in-channel islands and shoals habitats. Tidal emergent wetland occurs along all channels and most in-channel islands in the Delta. Although tidal emergent wetland does not occur in large continuous patches, this cover type provides important wildlife habitat functions and values. Tidal emergent wetland occurring on or adjacent to in-channel islands provides habitat that is relatively isolated from human disturbance and land-based predators. This land cover type provides nesting and foraging habitat for several songbirds, including red-winged blackbird (*Agelaius phoeniceus*), song sparrow (*Melospiza melodia*), common yellowthroat (*Geothlypis trichas*), and marsh wren (*Cistothorus palustris*); provides foraging and nesting habitat for rails (*Laterallus* spp.), other wading birds, and waterfowl; and provides foraging and cover habitat for common reptiles and amphibians, including garter snakes and non-native bullfrogs (*Lithobates catesbeianus*).

The tidal perennial aquatic type of land cover is present in the extended study area. Tidal perennial aquatic habitat includes deepwater, shallow aquatic, and unvegetated intertidal areas within sloughs and channels. Deepwater areas are largely unvegetated; however, beds of aquatic plants occasionally occur in shallower open-water areas. Deepwater areas provide foraging, roosting, and escape cover for a number of diving ducks, cormorants (*Phalacrocorax* spp.), grebes, and other waterfowl that are permanent residents or that winter in the extended study area. Deepwater areas provide habitat for several reptiles and amphibians, including western pond turtles and garter snakes. Common mammal species in the deepwater areas include river otter (*Lontra canadensis*), which use the deepwater areas for foraging and escape cover, and muskrats (*Ondatra zibethicus*), which may use deepwater areas as migration corridors between suitable foraging areas. Shallow aquatic areas may include open-water or areas dominated by tidal perennial aquatic plant species, such as water hyacinth (*Eichhornia* spp.) or water primrose (*Ludwigia* spp.). Colonies of these aquatic plants are generally infrequent but provide important habitat for a number of species. Shallow aquatic areas provide foraging habitat for diving ducks and dabbling ducks, other waterfowl species, belted kingfishers (*Megaceryle alcyon*), and wading birds. Shallow aquatic areas provide rearing, escape cover and foraging for reptiles and amphibians and may be used as foraging habitat by river otter and raccoon. Tidal flats provide important foraging habitat for migratory, resident, and wintering shorebirds; wading birds; and numerous other bird species. Tidal flats typically contain large



concentrations of aquatic invertebrate and mollusks that serve as the primary food source of shorebirds.

Open water in the Delta region includes sloughs and channels in the Delta, flooded islands, ponds, and bays. Deep open-water areas are largely unvegetated; beds of aquatic plants occasionally occur in shallower open-water areas. Open water provides resting and foraging habitat for waterbirds, including loons, pelicans, gulls, cormorants, and diving ducks. These species forage primarily on invertebrates and fish.

Agricultural lands, both those that are and those that are not seasonally flooded, generally include irrigation and drainage ditches. These lands support foraging habitat for many birds, such the greater sandhill crane (*Grus canadensis tabida*), tricolored blackbird (*Agelaius tricolor*), and Swainson's hawks, as well as garter snakes.

Resident and migratory waterfowl and shorebirds suffered perhaps the largest declines resulting from development and agriculture in the Delta. The declines in resident and migratory waterfowl populations before the early 20th century have been attributed to hunting and the large-scale reclamation of tidal marshes that occurred between 1860 and 1910. Changes in agricultural cropping patterns since the 1970s have increased the quality of waterfowl and shorebird habitat in the Delta. As a result, populations of waterfowl and shorebirds in the Delta have been increasing. Waterfowl and shorebirds forage primarily in natural and artificial wetlands and agricultural lands. The Delta supports approximately 10 percent of the Central Valley's wintering waterfowl and shorebird populations (CALFED 2000c). Several waterfowl species are particularly dependent on the Delta, including tundra swans (*Cygnus columbianus*), greater white-fronted geese (*Anser albifrons*), snow geese (*Chen caerulescens*), greater sandhill cranes, northern pintails (*Anas acuta*), and mallards (*Anas platyrhynchos*). More than 30 species of shorebirds regularly use the Delta; 6 species nest in the Delta, and the rest overwinter there or pass through during spring and fall migration (CALFED 2000c). Important foraging habitats include permanent saline, brackish, and freshwater marshes; seasonal wetlands; and agricultural cropland. Large seasonal wetlands managed for waterfowl are located in the northwestern part of the Delta region, west of the Sacramento Deep Water Ship Channel. These seasonal freshwater wetlands are of great importance to migratory waterfowl and shorebird populations for the forage that they provide during fall, winter, and spring, when bird populations in the Delta increase dramatically.

*San Joaquin River basin to the Delta* The current wildlife habitat value of this area is somewhat limited by the predominance of agricultural lands, which support a relatively low diversity of wildlife species. However, the orchards, row and field crops, and fallow fields can be used by a number of common species, and fallow fields and some crops (e.g., wheat and barley) can support a variety of small mammals and provide high-quality foraging habitat for many

species of raptors. More importantly, remnant native vegetation patches are likely to support a high diversity of wildlife species.

Waterfowl and shorebird numbers in the San Joaquin River region historically were greater than those for the Sacramento River region (CALFED 2000c). In addition to the factors that reduced waterfowl and shorebird populations in the Sacramento River region, the loss of additional wetlands in the San Joaquin River region caused by the accumulation of minerals and pesticides resulted in a compounded detrimental effect on waterfowl and shorebird numbers. Efforts to restore damaged wetlands, prevent harmful runoff from entering the wetlands, and manage agricultural lands to favor waterfowl and shorebirds during winter have aided the recovery of these species in the region. The San Joaquin River region supports approximately 25 percent of the Central Valley waterfowl and shorebird populations, and up to 30 percent of the wintering duck population (CALFED 2000c).

**CVP/SWP Service Areas** The CVP/SWP service areas contain a large diversity of both lowland and upland habitats and species, although agricultural and urban growth has reduced the area and connectivity of important habitats that are critical to sustaining a wide variety of unique plants and animals (CALFED 2000c). The agricultural land and urban development that dominate the CVP/SWP service areas, respectively, can support many wildlife species, most of which are highly adapted to these disturbed environments. Agricultural land is not generally considered important wildlife habitat but is used by many species, particularly as foraging habitat. Wildlife found in agricultural areas varies depending upon crop type and time of year. Wildlife found in urban areas is often dependent upon surrounding land uses and the presence or absence of nearby natural vegetation. In densely urbanized areas, a large percentage of the wildlife can be made up of exotic species. Urban areas provide habitat for species also found in agricultural areas, such as mourning dove, American robin, and western gray squirrel.

### ***Special-Status Species***

Special-status species addressed in this section include animals that are legally protected or are otherwise considered sensitive by Federal, State, or local resource conservation agencies and organizations. Specifically, these include species that are federally listed and/or State-listed as rare, threatened, or endangered; those considered as candidates or proposed for listing as threatened or endangered; species identified by CDFW as fully protected or species of special concern; or by USFS as sensitive, endemic, or needing additional survey or management actions; animals protected by the California Fish and Game Code; and those designated as MSCS covered species by CALFED.

### ***Primary Study Area***

**Shasta Lake and Vicinity** Special-status wildlife species with the potential to occur in the Shasta Lake and vicinity portion of the primary study area were determined using several database searches; review of USFWS and CDFW



special-status species lists for Shasta County; review of the CALFED MSCS list; review of other appropriate literature; discussions with the U.S. Department of the Interior, Bureau of Land Management (BLM), CDFW, California Department of Water Resources (DWR), USFS, and USFWS personnel; and professional experience in the area. All special-status wildlife species potentially occurring in the Shasta Lake and vicinity portion of the primary study area are discussed in Attachment 1 of the Wildlife report, which provides a general comparison of habitat requirements for each species and the general habitats in the primary study area above Shasta Dam. For those special-status species for which generally suitable habitat was determined to be present, results from the various vegetation habitat mapping and wildlife surveys conducted in the area by Reclamation since 2002 were used to determine the likelihood of their presence in the primary study area above Shasta Dam (Table 1-5).

**Table 1-5. Wildlife Species of Concern in the Shasta Lake and Vicinity Portion of the Primary Study Area**

Common Name	Scientific Name	Status	Potential for Occurrence
Western bumble bee	<i>Bombus occidentalis</i>	USFS S	Various habitats with abundant flowering vegetation from spring through fall.
Chruch's sideband	<i>Monadenis churchi</i>	S&M	Potentially occurring in mixed conifer and conifer/woodland habitats. Many known occurrences in the Shasta Lake and vicinity portion of the study area.
Shasta sideband	<i>Monadenia troglodytes troglodytes</i>	FP, USFS S, S&M, MSCS m	Endemic to Shasta County. Potentially occurring in mixed conifer and woodland habitats, especially near limestone. Species occurs in limestone on the McCloud Arm from Potter Creek north.
Wintu sideband	<i>Monadenia troglodytes wintu</i>	FP, USFS S, S&M	Endemic to Shasta County. Potentially occurring in mixed conifer and woodland habitats, especially near limestone. Known to occur between the Pit and Squaw Creek arms and at Mountain Gate.
Oregon shoulderband	<i>Helminthoglypta hertlenii</i>	S&M	Potentially occurring in mixed conifer and conifer/woodland habitats. Many known occurrences in the Shasta Lake and vicinity portion of the study area.
Shasta chaparral	<i>Trilobopsis roperi</i>	FP, USFS S, S&M	Endemic to Shasta County. Potentially occurring in mixed conifer and conifer/woodland habitats. Known occurrences in the Shasta Lake and vicinity portion of the study area.
Shasta hesperian	<i>Vespericola shasta</i>	FP, USFS S, S&M	Endemic to Klamath Province. Potentially occurring in mixed conifer and conifer/woodland habitats (riparian and/or riverine habitats). Only known from the southeastern Klamath Mountains region. Known occurrences in the Shasta Lake and vicinity portion of the study area.

**Table 1-5. Wildlife Species of Concern in the Shasta Lake and Vicinity Portion of the Primary Study Area (contd.)**

Common Name	Scientific Name	Status	Potential for Occurrence
Shasta salamander	<i>Hydromantes shastae</i>	CT, USFS S, S&M, MSCS m, BLMS	Only known from the southeastern Klamath Mountains region. Potentially occurring in mixed conifer, woodland, and chaparral habitats, especially near limestone. Known occurrences in the Shasta Lake and vicinity portion of the study area.
Tailed frog	<i>Ascaphus truei</i>	CSC	Potentially occurring in stream habitats in the Shasta Lake and vicinity portion of the study area. Known occurrences in the McCloud Arm and the upper Sacramento Arm tributaries outside the study area boundaries (CDFG 2003).
California red-legged frog	<i>Rana draytonii</i>	FT, CSC, MSCS m	Requires aquatic habitat for breeding; also uses a variety of other habitat types including riparian and upland areas. A habitat assessment has been prepared to determine habitat suitability in the vicinity of Shasta Lake. Species has not been recorded in Shasta County since 1926 (University of Michigan Museum of Zoology 2009).
Foothill yellow-legged frog	<i>Rana boylei</i>	CSC, USFS S, MSCS m, BLMS	Potentially occurring in stream habitats. Known occurrences scattered throughout the Shasta Lake and vicinity portion of the primary study area.
Western pond turtle	<i>Actinemys marmorata</i>	CSC, USFS S, MSCS m	Potentially occurring in stream or other wetland habitats. Adjacent upland habitats are potential nesting areas. Known occurrences scattered throughout the Shasta Lake and vicinity portion of the primary study area.
Great blue heron	<i>Ardea herodias</i>	MSCS m	Known to breed in nearshore wooded habitat in the Turntable Bay area of Shasta Lake.
Cooper's hawk	<i>Accipiter cooperi</i>	MSCS m	Potentially occurring in mixed conifer and conifer/woodland habitats.
Northern goshawk	<i>Accipiter gentilis</i>	CSC, USFS S, BLMS	Potentially occurring in mixed conifer habitats. Known to occur in the upper McCloud Arm.
Bald eagle	<i>Haliaeetus leucocephalus</i>	FD, FB, CE, CP, USFS S, MSCS m, BLMS	Occur in riverine and lacustrine habitats. Common at Shasta Lake, and a substantial number of nests occur in the Shasta Lake and vicinity portion of the primary study area and vicinity. Shasta Lake has the highest density of breeding bald eagles in the continental United States.
Osprey	<i>Pandion haliaetus</i>	MSCS m	Occur in riverine and lacustrine habitats. Common at Shasta Lake, and many known nests occur in the Shasta Lake and vicinity portion of the primary study area and vicinity.



**Table 1-5. Wildlife Species of Concern in the Shasta Lake and Vicinity Portion of the Primary Study Area (contd.)**

Common Name	Scientific Name	Status	Potential for Occurrence
American peregrine falcon	<i>Falco peregrinus anatum</i>	FD, CD, CP, MSCS m	Potentially occurring in mixed conifer and conifer/woodland habitats. Nesting sites in the study area unlikely due to lack of suitable eyrie sites; however, potential eyrie sites occur adjacent to the Shasta Lake and vicinity portion of the primary study area. A historical nest site occurs in the cliffs near Shasta Caverns and a "new" nest site is believed to occur in cliffs along the Sacramento Arm of Shasta Lake. Another nest site is located south of Shasta Lake at Gray Rocks, near Mountain Gate.
Long-eared owl	<i>Asio otus</i>	CSC, MSCS m	Potentially occurring in coniferous forest habitats.
Northern spotted owl	<i>Strix occidentalis caurina</i>	FT, MSCS m	Potentially occurring in coniferous forest habitats. The species has been recorded within 0.5 mile of the study area along the Squaw Creek Arm. Potential dispersal habitat occurs in the Shasta Lake and vicinity portion of the primary study area. No designated critical habitat occurs in the Shasta Lake and vicinity portion of the primary study area.
Vaux's swift	<i>Chaetura vauxi</i>	CSC	Potentially occurring in coniferous forest and conifer/woodland habitats. Known to occur in the Shasta Lake and vicinity portion of the study area.
Willow flycatcher	<i>Empidonax traillii</i>	CE, USFS S, MSCS r	Uncommon migrant in riparian habitat; unlikely to nest in the Shasta Lake and vicinity portion of the primary study area.
Purple martin	<i>Progne subis</i>	CSC	Potentially occurring in conifer, woodland, and riparian habitats. Foraging habitat occurs throughout Shasta Lake and vicinity portion of the primary study area. Shasta Lake is one of the few known breeding sites in interior California.
Yellow warbler	<i>Dendroica petechia brewsteri</i>	CSC, MSCS r	Potentially occurring in riparian habitats. Known occurrences in and near the Shasta Lake and vicinity portion of the primary study area.
Yellow-breasted chat	<i>Icteria virens</i>	CSC, MSCS m	Potentially occurring in riparian habitats. Known occurrences in and near the Shasta Lake and vicinity portion of the primary study area.
Pallid bat	<i>Antrozous pallidus</i>	CSC, USFS S, BLMS	Potentially occurring in mixed conifer and conifer/woodland habitat throughout the study area.
Townsend's big-eared bat	<i>Plecotus townsendii</i>	CSC, USFS S	Potentially occurring in mixed conifer and conifer/woodland habitat throughout the study area. The species was observed in the Shasta Lake and vicinity portion of the primary study area by Reclamation in June 2008.
Spotted bat	<i>Euderma maculatum</i>	CSC, BLMS	Potentially occurring in mixed conifer and conifer/woodland habitat throughout the study area. Species has been recorded on Squaw Creek within approximately 6 miles of the Shasta Lake and vicinity portion of the primary study area.

**Table 1-5. Wildlife Species of Concern in the Shasta Lake and Vicinity Portion of the Primary Study Area (contd.)**

Common Name	Scientific Name	Status	Potential for Occurrence
Western red bat	<i>Lasiurus blossevillii</i>	CSC	Potentially occurring in mixed conifer and conifer/woodland habitat throughout the Shasta Lake and vicinity portion of the primary study area.
Long-eared myotis	<i>Myotis evotis</i>	BLMS	Potentially occurring in a wide variety of forest habitats throughout the study area.
Yuma myotis	<i>Myotis yumanensis</i>	BLMS	Potentially occurring in a wide variety of forest habitats throughout the study area.
Fringed myotis	<i>Myotis thysanodes</i>	USFS S	Potentially occurring in mixed conifer and conifer/woodland habitat throughout the Shasta Lake and vicinity portion of the primary study area.
Western mastiff bat	<i>Eumops perotis</i>	CSC, MSCS m*, BLMS *californicus subspecies only	Potentially occurring in mixed conifer and conifer/woodland habitat throughout the Shasta Lake and vicinity portion of the primary study area.
Ringtail	<i>Bassariscus astutus</i>	CP, MSCS m	Potentially occurring in mixed conifer and conifer/woodland habitats. Known occurrences in and near the Shasta Lake and vicinity portion of the primary study area.
American marten	<i>Martes americana</i>	USFS S	Mixed evergreen forests with abundant cavities for denning and nesting and open areas for foraging.
Pacific fisher	<i>Martes pennanti</i>	FC, CSC, USFS S, BLMS	Potentially occurring in mixed conifer and conifer/woodland habitats. Known occurrences in and near the Shasta Lake and vicinity portion of the primary study area.

Note:

<sup>1</sup>Status Definitions

Key:

BLMS = U.S. Bureau of Land Management sensitive

CD= California delisted

CE = California endangered

CP = California fully protected

CSC = California species of special concern

CT = California (State) listed as threatened

FB = Federal Bald and Golden Eagle Protection Act

FC = Federal candidate for listing

FD = Federally delisted

FP = Federally petitioned for listing

FPD = Proposed for Federal delisting

FT = Federally listed as threatened

MSCS = Multi-Species Conservation Strategy covered species

m = Maintain. Ensure that any adverse effects on the species that could be associated with implementation of CALFED Bay-Delta Program actions will be fully offset through implementation of actions beneficial to the species.

r = Contribute to recovery. Implement some of the actions deemed necessary to recover species' populations in the Multi-Species Conservation Strategy focus area.

USFS M = U.S. Forest Service survey and manage species

USFS S = U.S. Forest Service sensitive

The survey and manage species include all species included in the *January 2001 Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and Other Mitigation Measures Standards and Guidelines* (U.S. Department of Agriculture and U.S. Department of the Interior 2001) (2001 S&M ROD).

The current survey and manage species list is from the 2001 S&M ROD and includes species listed in the 2001 S&M ROD Survey and Manage Standards and Guidelines and Category Assignment (BLM December 2001). For the purposes of this evaluation, survey and manage species of concern include taxa



that are designated as Category A and C by the current category assignment. These categories include taxa that require what are known as predisturbance (i.e., preproject) surveys.

The CNDDDB was reviewed for records of special-status plant species in or near the Shasta Lake and vicinity portion of the primary study area. The CNDDDB is a database consisting of historical observations of special-status plant species, wildlife species, and natural communities. The CNDDDB is limited to reported sightings and is not a comprehensive list of special-status species that could occur in a particular area.

Species accounts for special-status wildlife in the Shasta Lake and vicinity portion of the primary study area are described in detail in Attachment 2. Figures 1-6a through 1-6f depict the known locations of special-status wildlife species in the primary study area above Shasta Dam located during various surveys conducted by Reclamation and from USFS records. Figures 1-7a through 1-7f depict the known locations of special-status terrestrial mollusks.

#### *Summary of Wildlife Investigations*

*Terrestrial Mollusk Surveys (Survey and Manage)* Reclamation has conducted three survey efforts to survey and manage terrestrial mollusk species in the Shasta Lake and vicinity portion of the primary study area. These include protocol-level efforts during 2002–2003 and 2005 along selected portions of the Shasta Lake shoreline, and surveys conducted in 2010 at the relocation areas. Additionally, many other terrestrial mollusk locations have been found incidentally during numerous other biological survey tasks throughout the Shasta Lake and vicinity portion of the primary study area. Six survey and manage terrestrial mollusk species have been found to date: Church's sideband (*Monadenia churchi*), Shasta sideband (*Monadenia troglodytes troglodytes*), Wintu sideband (*Monadenia troglodytes wintu*), Oregon shoulderband (*Helminthoglypta hertlenii*), Shasta chaparral (*Trilobopsis roperi*), and Shasta hesperian (*Vespericola shasta*). Church's sideband and Oregon shoulderband were the most commonly occurring terrestrial mollusk species, as they were found at 325 and 220 locations, respectively. Shasta hesperian was found at 69 locations, while Shasta sideband and Shasta chaparral were found at 29 locations each. Wintu sideband was the least commonly occurring terrestrial mollusk species and was found at 2 locations (Figures 1-7a through 1-7f).

*Shasta Salamander Surveys* Reclamation has conducted three survey efforts for Shasta salamander in the Shasta Lake and vicinity portion of the primary study area. These include survey efforts during 2003 and 2006–2007 along selected portions of the Shasta Lake shoreline and surveys performed in 2010 and 2011 at the relocation areas. Additionally, several other Shasta salamander locations have been found incidentally during other biological survey tasks throughout the Shasta Lake and vicinity portion of the primary study area. Collectively, Shasta salamanders have been found at 39 locations

during the survey efforts. These findings and other known locations show that this species occurs in all arms of Shasta Lake in both limestone and nonlimestone habitats (Figures 1-6a through 1-6f).

*Bald Eagle/Osprey Surveys* Reclamation mapped all known bald eagle and osprey nests in the Shasta Lake and vicinity portion of the primary study area in 2007. Additional data including diameter of nest trees, nest tree height, nest height, proximity to the high-water mark, surrounding vegetation, and shoreline erosion rating were recorded for the bald eagle nests. Twenty-eight bald eagle and 54 osprey nests were located. Reclamation continued surveys and coordination with the USFS through 2013 to maintain current bald eagle and osprey nest site locations. Currently, 32 bald eagle and 54 osprey nest sites are known within or near the Shasta Lake and vicinity portion of the primary study area (Figures 1-6a through 1-6f).

*Neotropical Migrant Bird Surveys* Reclamation conducted a breeding bird survey in the Shasta Lake and vicinity portion of the primary study area in 2007. Additionally, focused surveys for purple martins and an analysis of purple martin habitat at Shasta Lake were conducted. These surveys provided information on use of the Shasta Lake and vicinity portion of the primary study area by breeding birds, including breeding neotropical migrant species. Sixty-seven bird species were detected during these surveys, including 38 neotropical migrant species.

These surveys also provided a basic understanding of purple martin ecology in the Shasta Lake and vicinity portion of the primary study area. Purple martin monitoring has continued through 2013, providing additional species distribution and habitat-use information (Figures 1-6d through 1-6f). The nesting purple martin population has totaled 18, 21, 24, 28, 42, 27, and 17 pairs during 2007 through 2013, respectively. Most nest sites occur in flooded snags located in the reservoir; however, recent monitoring results show an increase in use of upland nest sites. Limited historical purple martin survey information available from 1978 to 2001 showed 14 to 19 nesting pairs at Shasta Lake. During the monitoring period, the nesting purple martin population showed small increases from 2007 through 2010, a large increase in 2011, and then generally returned to 2009 and 2010 levels in 2012. For unknown reasons a marked decrease to 17 pairs occurred in 2013, a population size similar to historic numbers. The 2007-2013 monitoring results initially show a stable to increasing population, followed by a decrease and return to more historic levels.



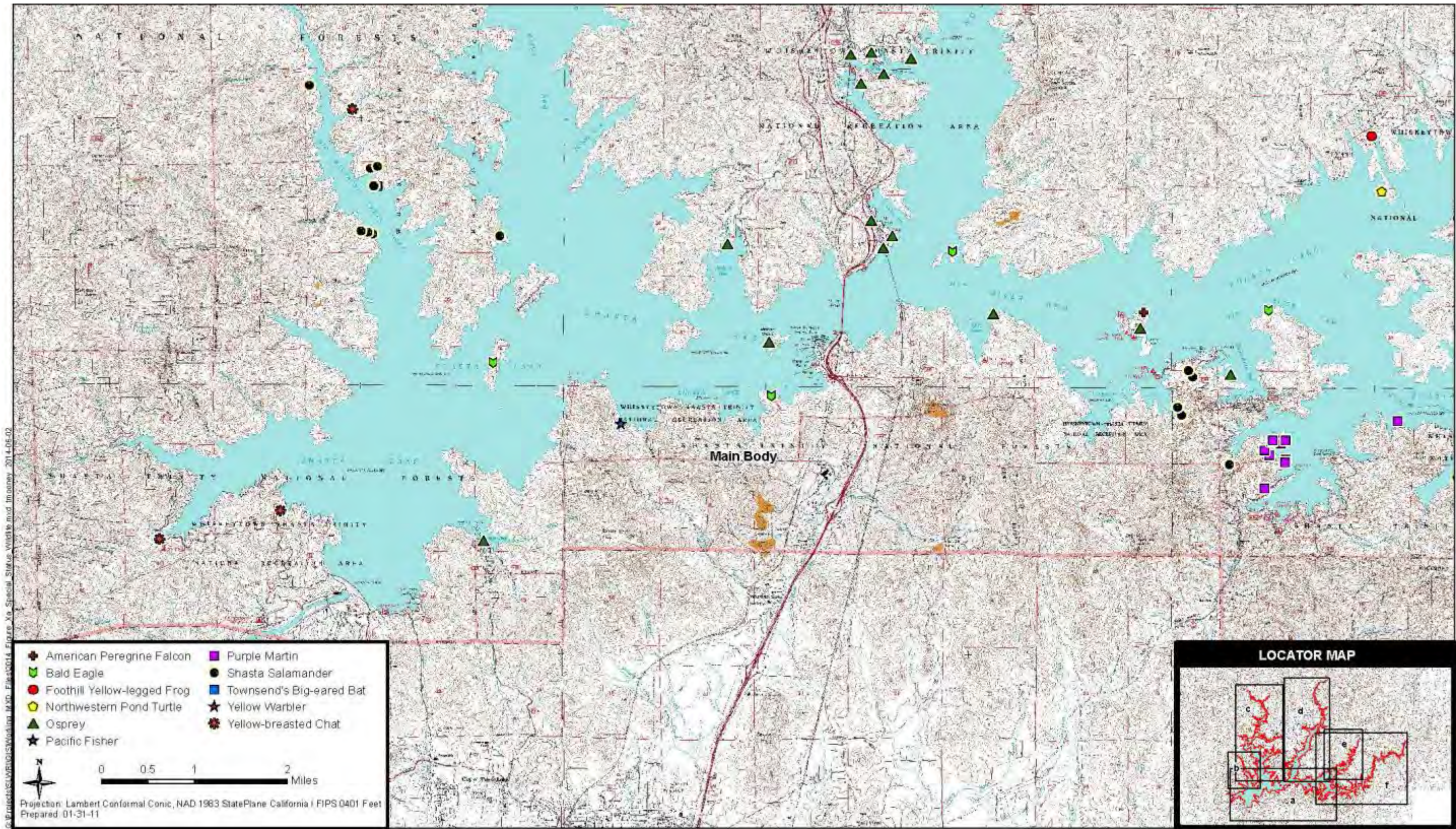


Figure 1-6a. Special-Status Wildlife Occurring in Shasta Lake and Vicinity



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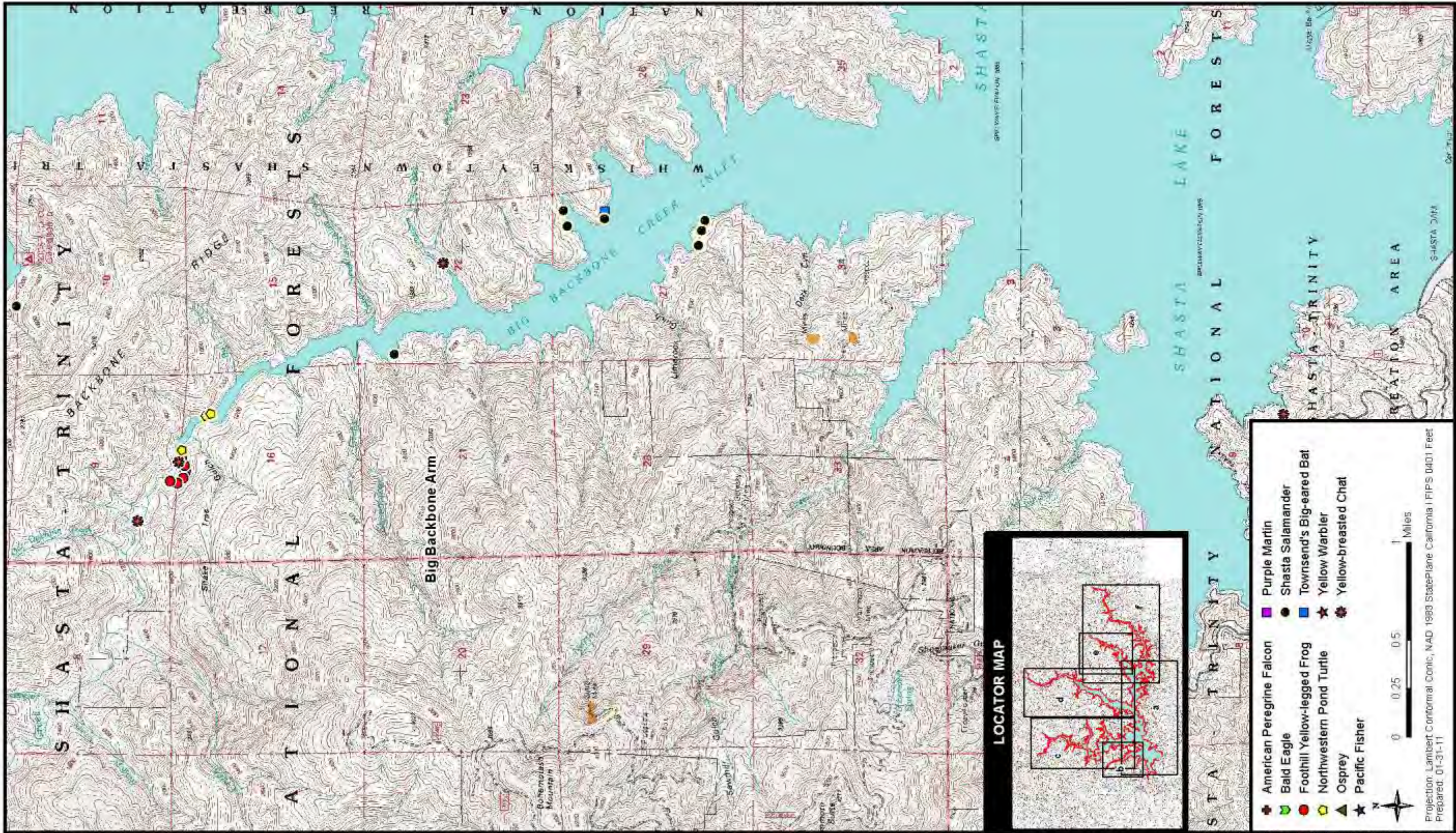


Figure 1-6b. Special-Status Wildlife Occurring in Shasta Lake and Vicinity



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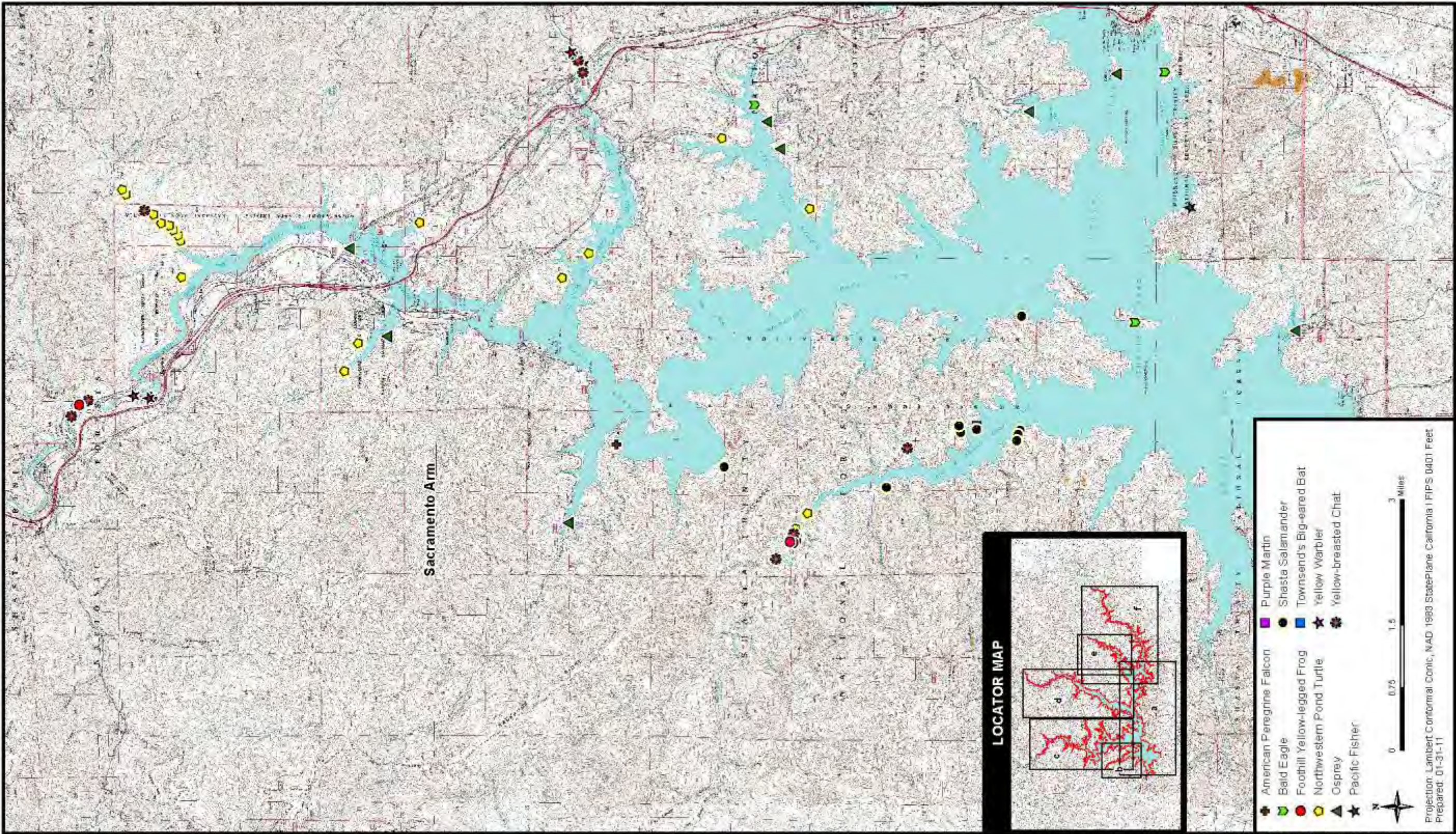


Figure 1-6c. Special-Status Wildlife Occurring in Shasta Lake and Vicinity



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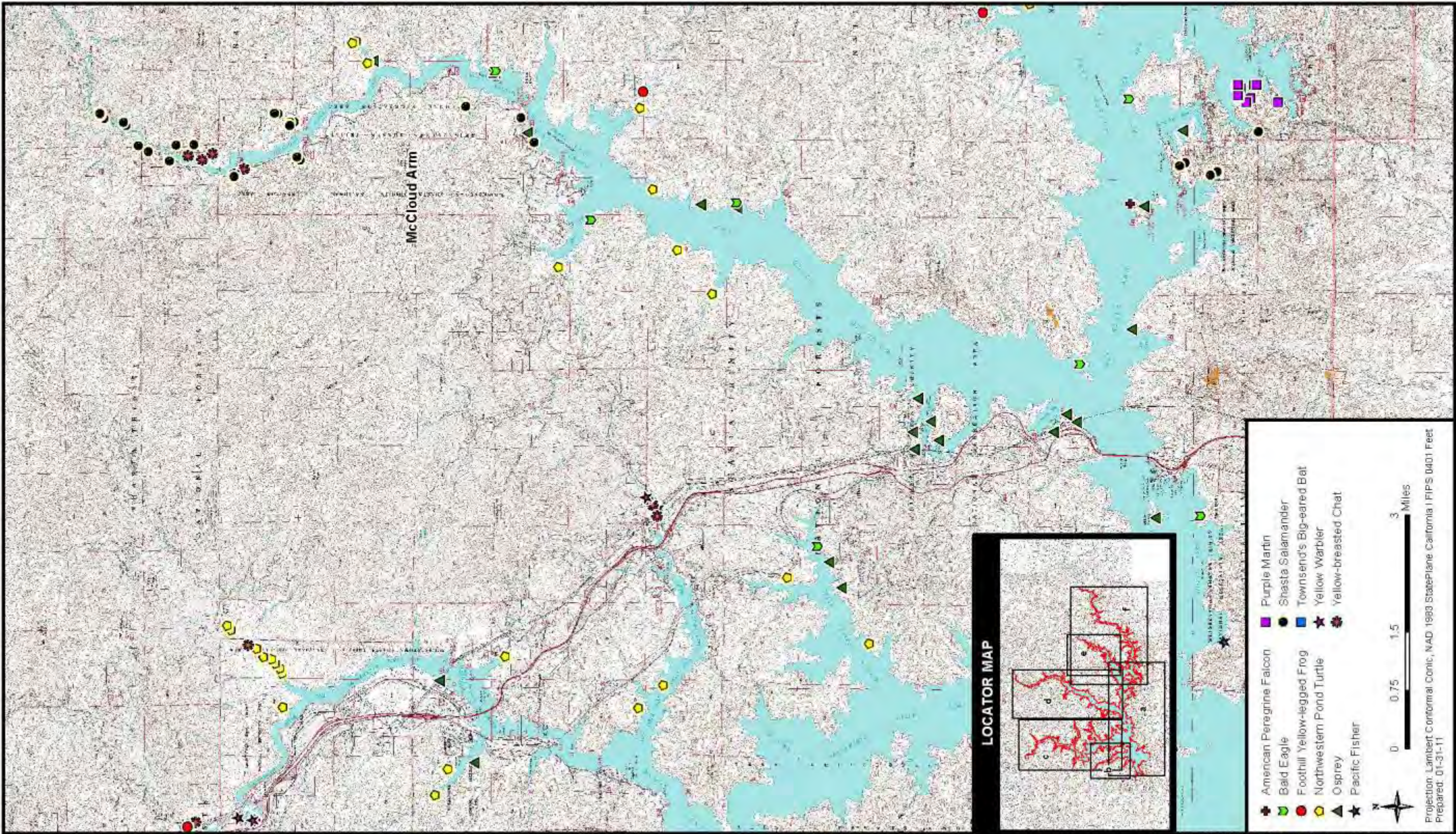


Figure 1-6d. Special-Status Wildlife Occurring in Shasta Lake and Vicinity



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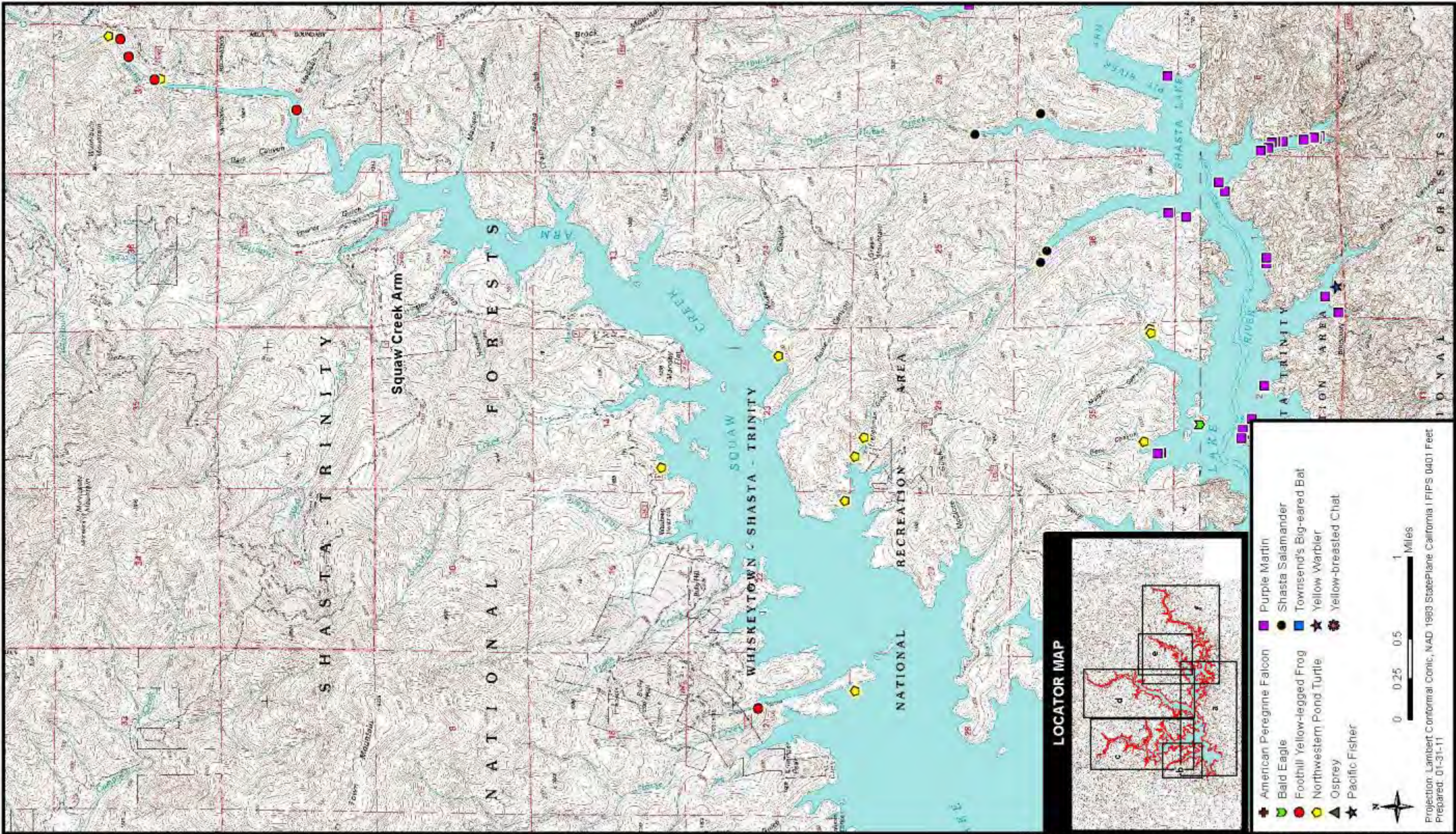


Figure 1-6e. Special-Status Wildlife Occurring in Shasta Lake and Vicinity



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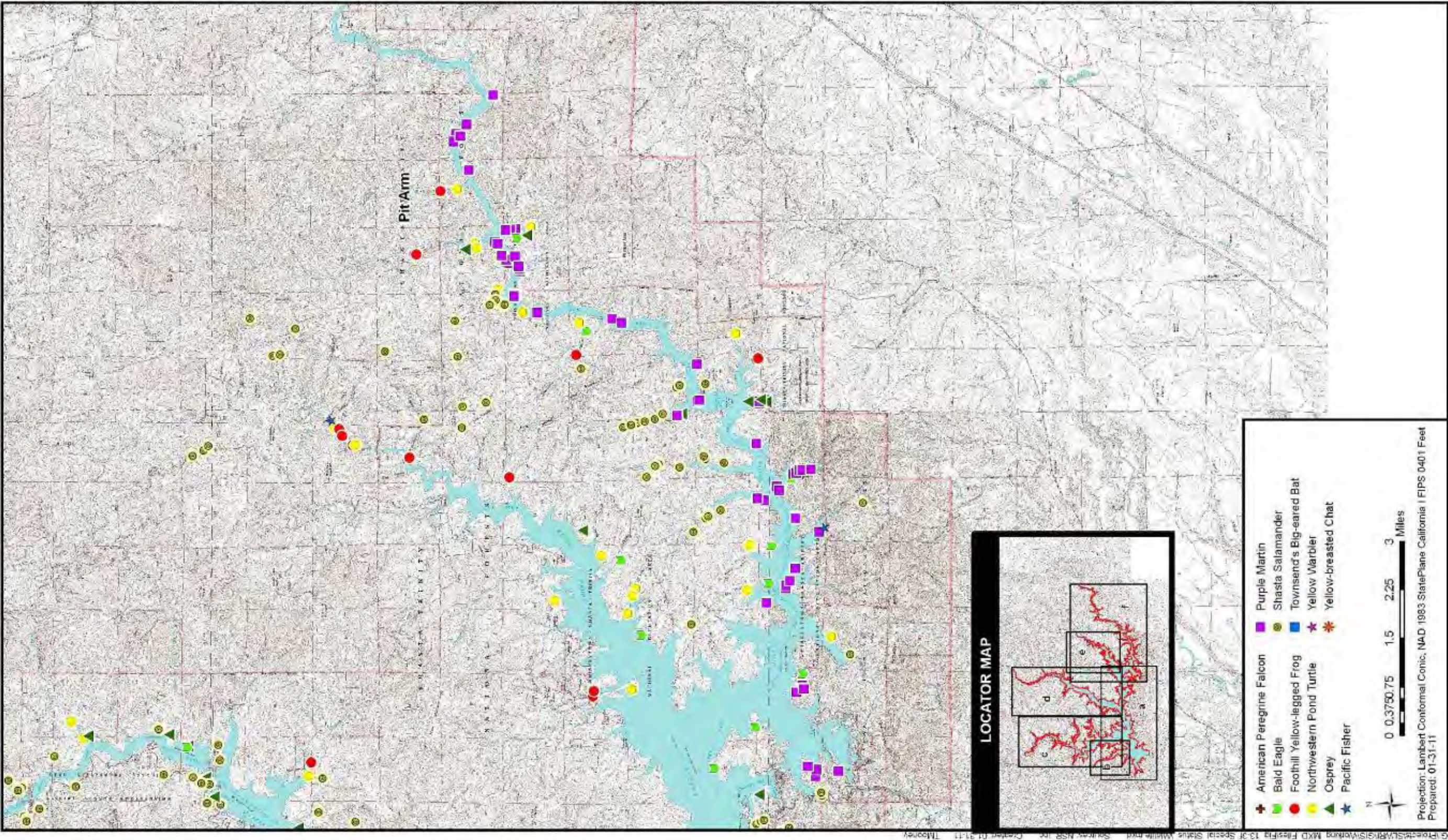


Figure 1-6f. Special-Status Wildlife Occurring in Shasta Lake and Vicinity



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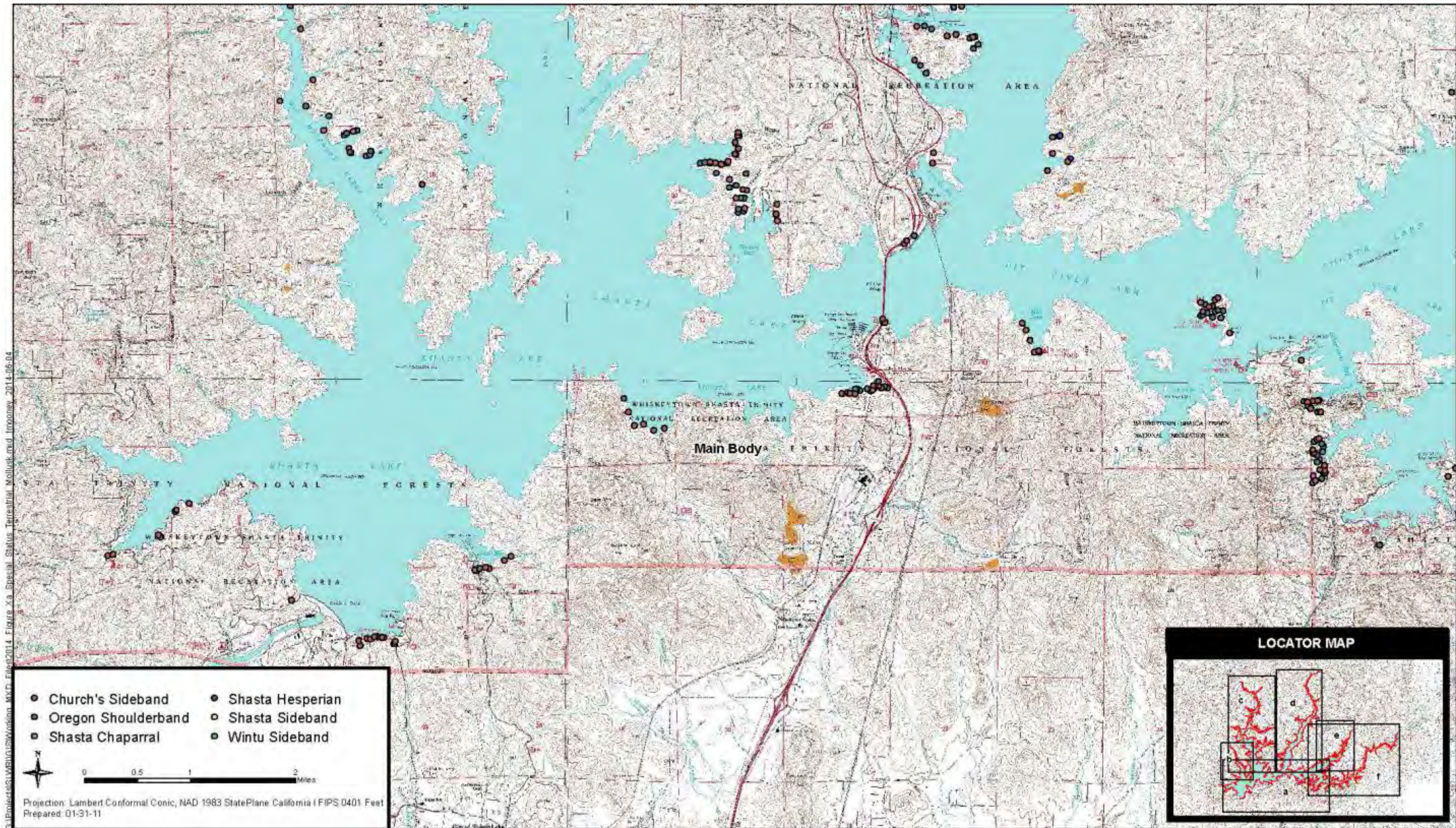
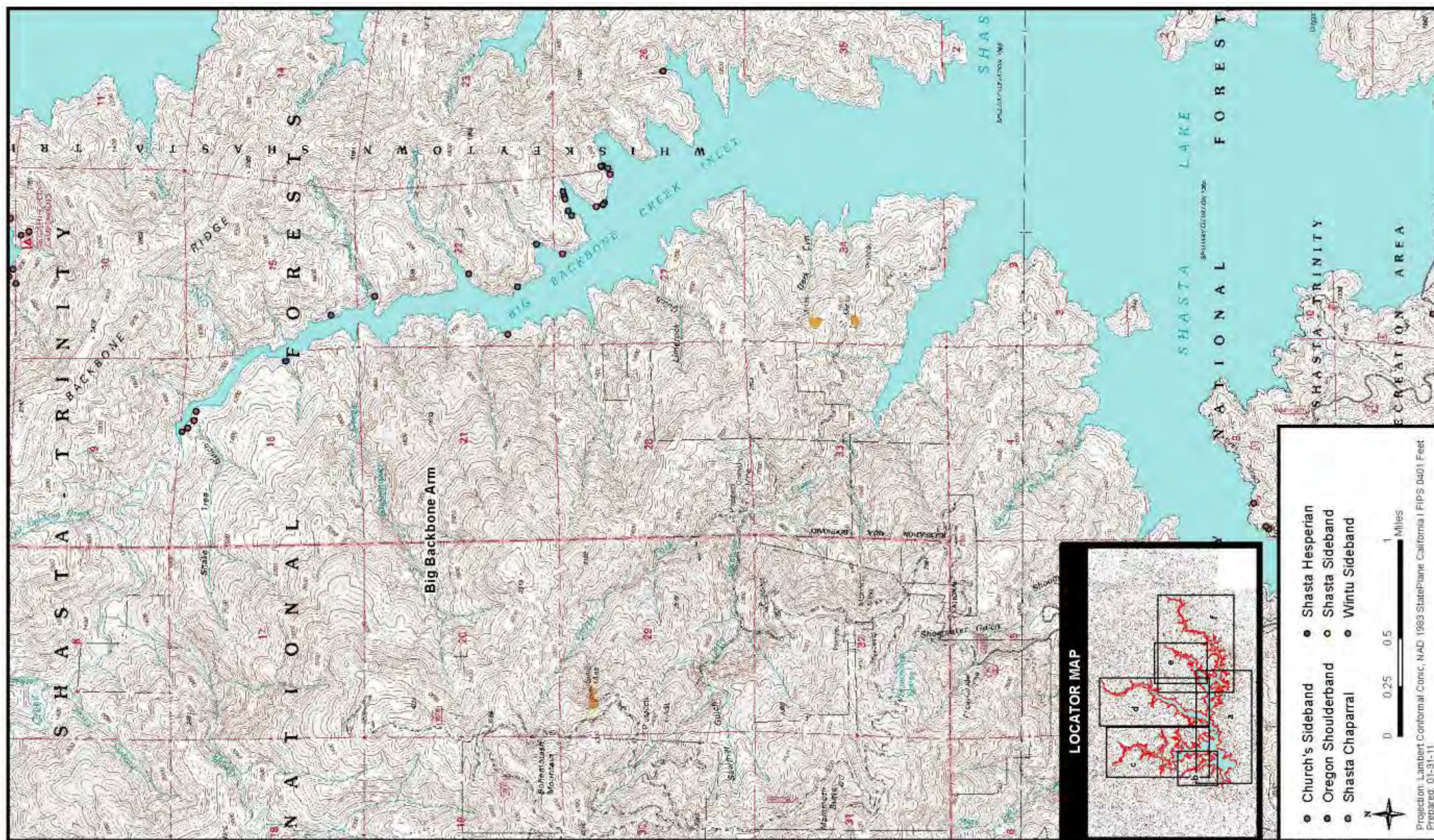


Figure 1-7a. Special-Status Terrestrial Mollusks Occurring in Shasta Lake and Vicinity



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**Figure 1-7b. Special-Status Terrestrial Mollusks Occurring in Shasta Lake and Vicinity**



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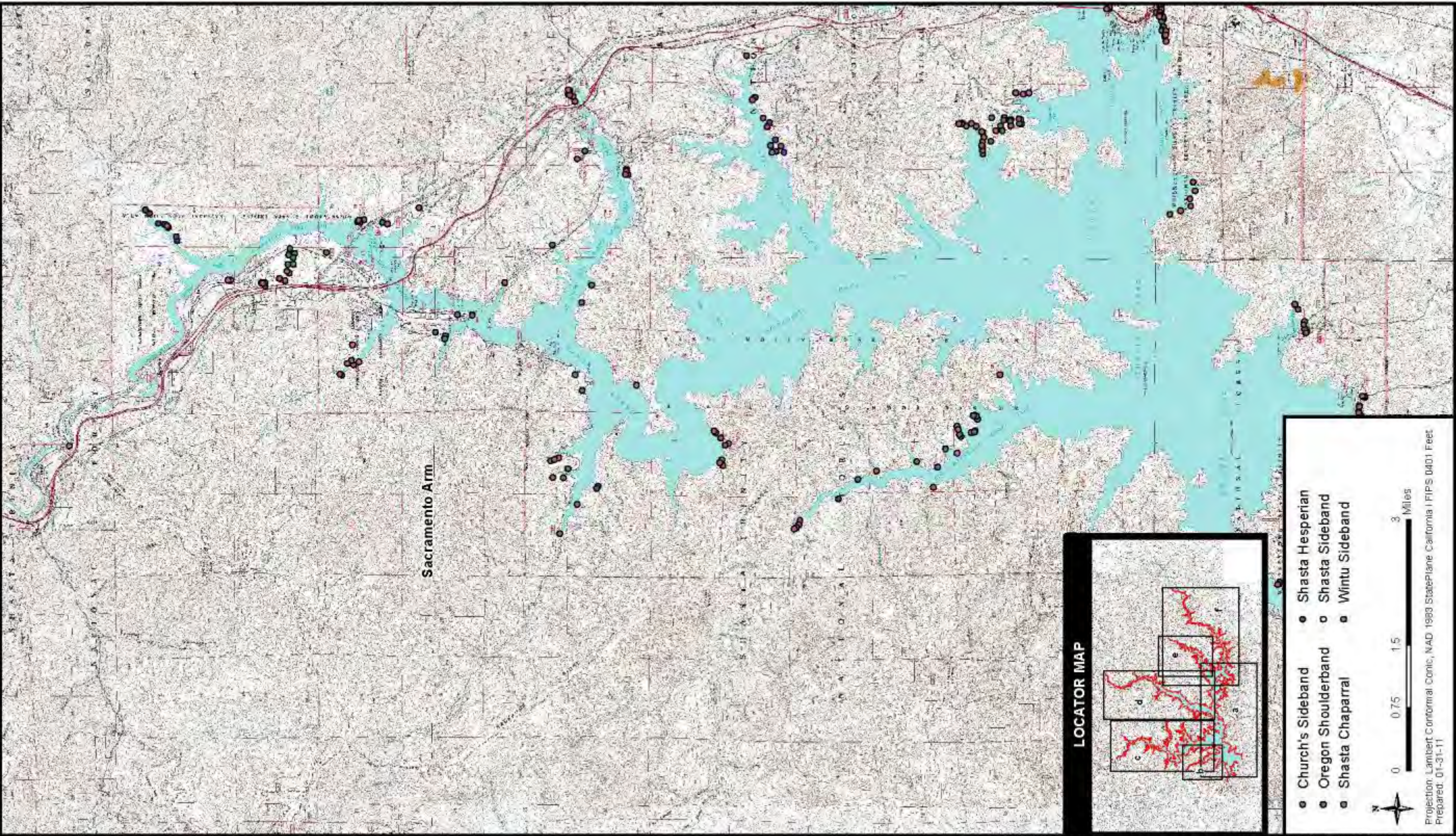


Figure 1-7c. Special-Status Terrestrial Mollusks Occurring in Shasta Lake and Vicinity



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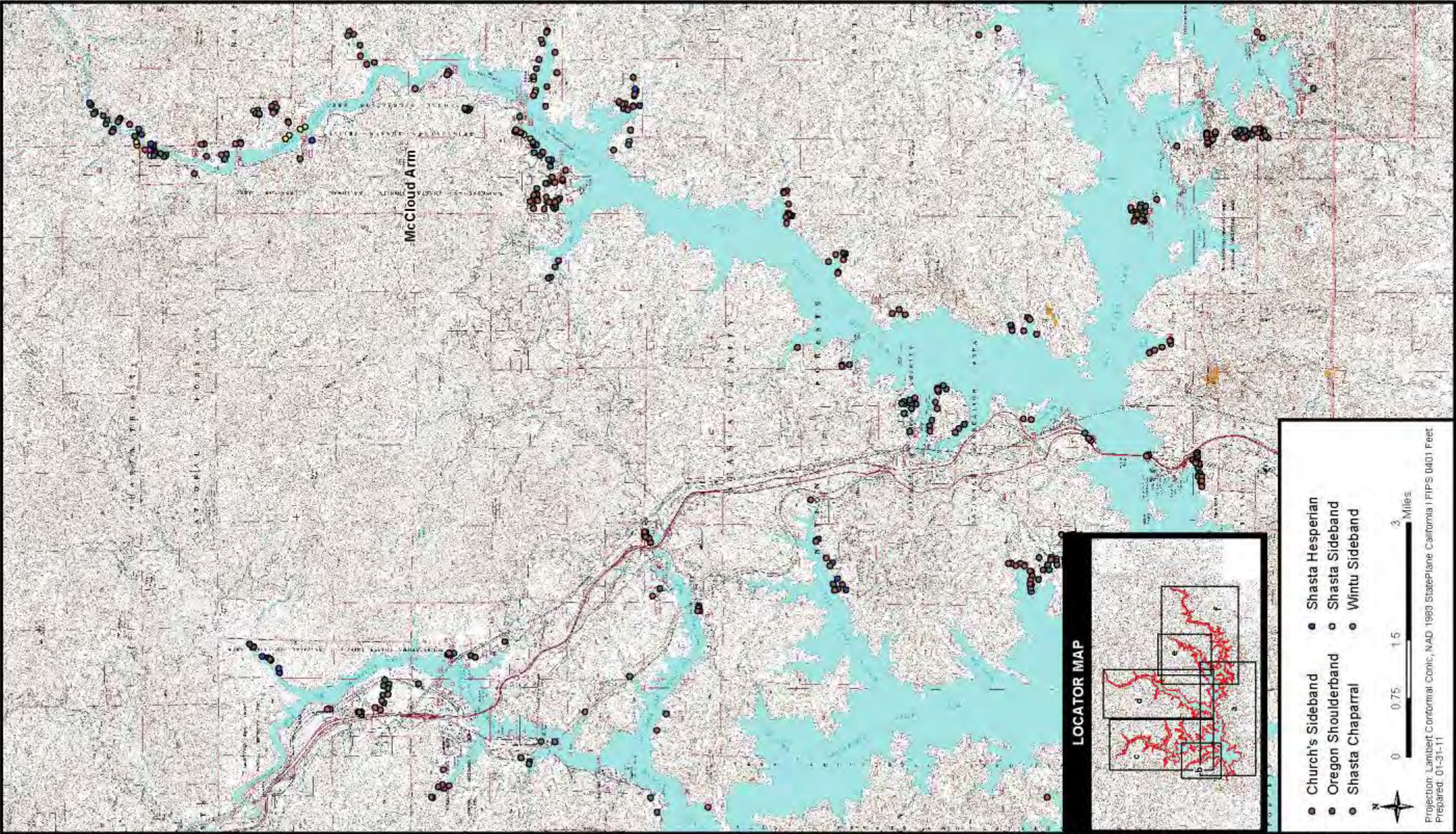


Figure 1-7d. Special-Status Terrestrial Mollusks Occurring in Shasta Lake and Vicinity



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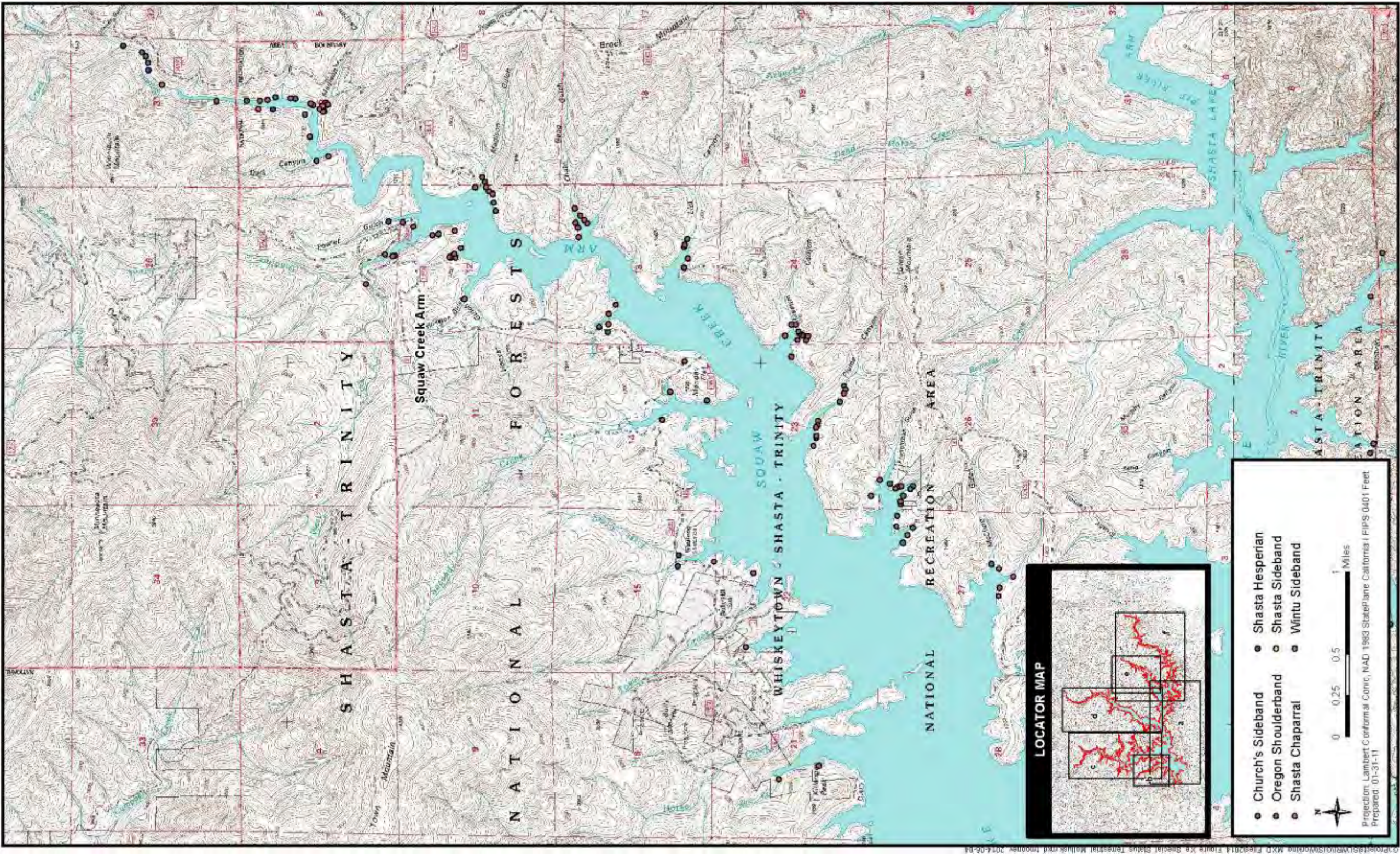


Figure 1-7e. Special-Status Wildlife Occurring in Shasta Lake and Vicinity



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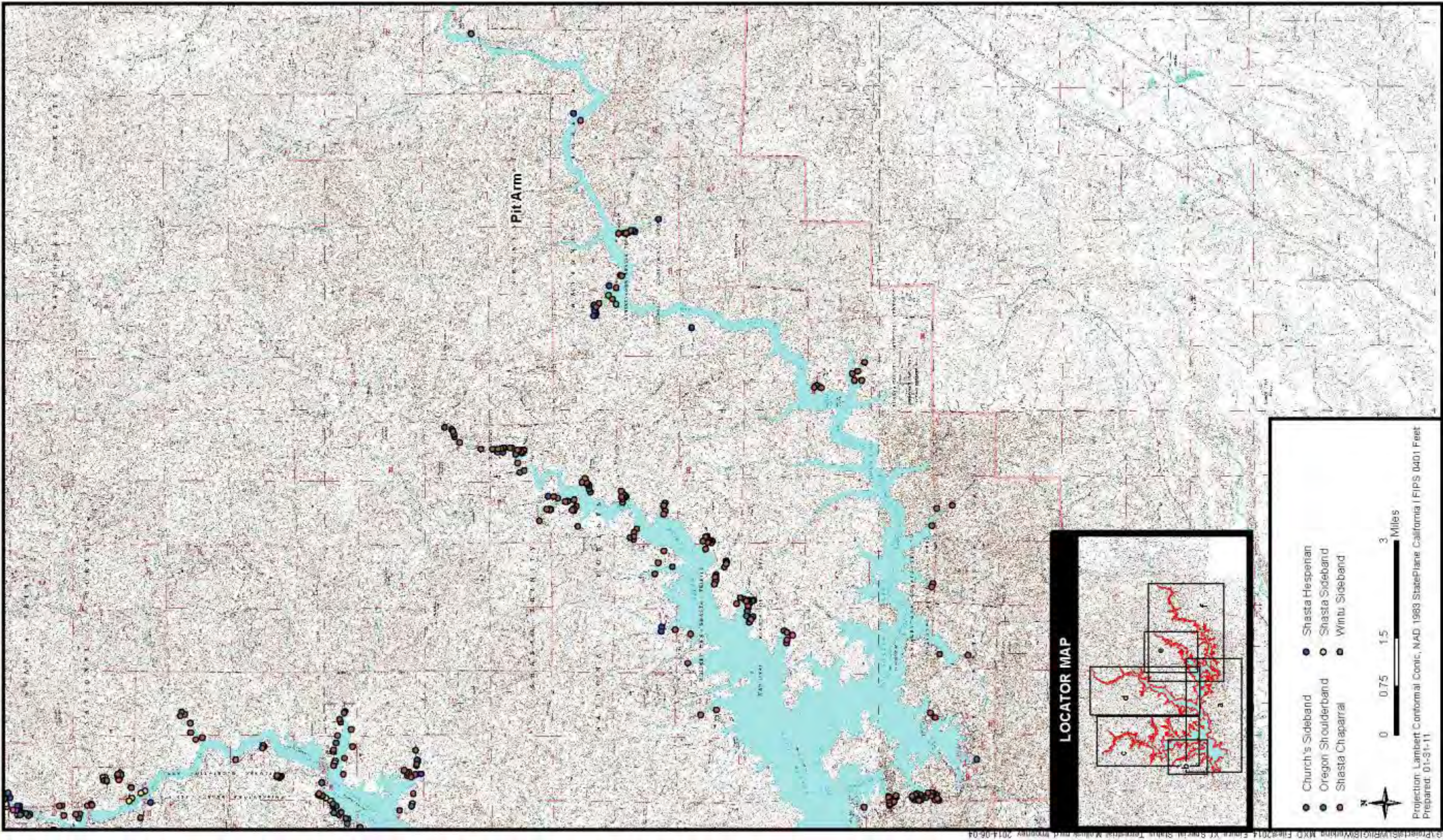


Figure 1-7f. Special-Status Terrestrial Mollusks Occurring in Shasta Lake and Vicinity



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*Forest Carnivore Surveys* Reclamation conducted surveys for sensitive forest carnivore species (forest carnivores) in the Shasta Lake and vicinity portion of the primary study area during 2003–2005. The specific sensitive forest carnivore species (i.e., “target species”) surveyed included the Sierra Nevada red fox (*Vulpes vulpes necator*), American marten (*Martes americana*), Pacific fisher (*Martes pennanti*), and wolverine (*Gulo gulo*). One target forest carnivore species, the Pacific fisher, was detected. Pacific fisher was detected at 13 locations scattered in all areas of the Shasta Lake and vicinity portion of the primary study area, except the McCloud Arm (Figures 1-6a through 1-6f). Additionally, the ringtail, a California fully protected species, was detected in all areas of the Shasta Lake and vicinity portion of the primary study area.

The Pacific fisher survey results provide additional information on habitat use and distribution of the species in Northern California. The survey findings represent the southeastern-most Pacific fisher occurrences in the Klamath region. Additionally, these findings show Pacific fishers in areas generally (previously) not considered suitable habitat in California, including open second-growth conifer, hardwood-conifer, and hardwood habitats that have extensive chaparral components. Pacific fishers were also detected in forest habitats that were barren or semi-barren 50 to 60 years ago because of historical copper mining and smelting activities, and near commercial, rural residential, and industrial development areas.

*California Red-Legged Frog Assessment* Reclamation conducted a California red-legged frog habitat assessment in the Shasta Lake and vicinity portion of the primary study area in 2010. In consultation with USFWS, an assessment area was developed and field surveys of aquatic habitats were conducted in accordance with Revised Guidance on Site Assessments and Field Surveys for the California Red-Legged Frog (USFWS 2005a). The results suggest only one feature may represent potential California red-legged frog breeding habitat. A California red-legged frog habitat assessment report was submitted to the USFWS.

**Upper Sacramento River (Shasta Dam to Red Bluff)** The following section provides a detailed discussion of wildlife species of concern specific to the potential Sacramento River downstream habitat restorations areas, as well as the wildlife species of concern known or with potential to occur along the Sacramento River throughout the rest of the primary study area.

*Biological Resource Assessments for Potential Sacramento River Downstream Habitat Restoration Areas* Reclamation conducted biological resource assessments of at each of the six potential Sacramento River downstream habitat restoration areas during 2013. The assessments include botanical surveys for special-status plants and noxious weeds, vegetation and wildlife habitat mapping, general wildlife surveys, breeding bird surveys, California red-legged frog habitat assessments, and delineations of Waters of the U.S. The biological resource assessment results are included as Attachments 12 through

23. Potentially occurring special-status wildlife species at the potential Sacramento River downstream habitat restoration areas are described in Table 1-6.

**Table 1-6. Wildlife Species of Concern in the Potential Sacramento River Downstream Habitat Restoration Areas**

Common Name	Scientific Name	Status	Potential for Occurrence
Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	FT	Potentially occurring in blue elderberry shrubs.
California red-legged frog	<i>Rana draytonii</i>	FT, CSC, MSCS m	Potentially occurring at restoration sites or locations in the vicinity with potential breeding habitat present.
Western pond turtle	<i>Actinemys marmorata</i>	CSC, USFS S, MSCS m	Potentially occurring in stream or other wetland habitats. Adjacent upland habitats are potential nesting areas.
Double-crested cormorant	<i>Phalacrocorax auritus</i>	MSCS m	Commonly occurs in the general vicinity in riverine and adjacent riparian habitats. No known rookery sites at any potential Sacramento River downstream habitat restoration areas.
Great egret	<i>Ardea alba</i>	MSCS m	Commonly occurs in the general vicinity in riverine and adjacent riparian habitats. No known rookery sites at any potential Sacramento River downstream habitat restoration areas.
Great blue heron	<i>Ardea herodias</i>	MSCS m	Commonly occurs in the general vicinity in riverine and adjacent riparian habitats. No known rookery sites at any potential Sacramento River downstream habitat restoration areas.
Black-crowned night heron	<i>Nycticorax nycticorax</i>	MSCS m	Commonly occurs in the general vicinity in riverine and adjacent riparian habitats. No known rookery sites at any potential Sacramento River downstream habitat restoration areas.
Cooper's hawk	<i>Accipiter cooperi</i>	MSCS m	Potentially occurring in forested riparian and woodland habitats.
Bald eagle	<i>Haliaeetus leucocephalus</i>	FD, FB, CE, CP, USFS S, MSCS m, BLMS	Occurs year-round in the vicinity. Two known nests in the general vicinity of the potential Sacramento River downstream habitat restoration areas
Osprey	<i>Pandion haliaetus</i>	MSCS m	Commonly occurs in the general vicinity of the potential Sacramento River downstream habitat restoration areas. No known nests at any potential Sacramento River downstream habitat restoration areas.



**Table 1-6. Wildlife Species of Concern in the Potential Sacramento River Downstream Habitat Restoration Areas (contd.)**

Common Name	Scientific Name	Status	Potential for Occurrence
Western yellow-billed cuckoo	<i>Coccyzus americanus occidentalis</i>	FT, CE	Occurs only along the upper Sacramento Valley portion of the Sacramento River from Colusa to Red Bluff, the Feather River in Sutter Co., the South Fork Kern River in Kern Co., the Owen's River in Inyo Co., and along the Santa Ana, Amargosa, and lower Colorado Rivers. Riparian forest habitats in the potential Sacramento River downstream habitat restoration areas provide potential nesting habitat; however, these areas is located approximately 24 miles north of the northern extent of the known species geographic range.
Barrows goldeneye	<i>Bucephala islandica</i>	—/SC	Winter visitor to bays, lagoons, estuaries, freshwater lakes and large fast-moving rivers. Formerly nested in California at high mountain lakes. Regularly occurs on the Sacramento River in the Redding area during winter.
Willow flycatcher	<i>Empidonax traillii</i>	CE, USFS S, MSCS r	Uncommon migrant species in riparian habitat; may occur briefly during migration. No potentially nesting habitat present.
Yellow warbler	<i>Dendroica petechia brewsteri</i>	CSC, MSCS r	Potentially occurring in riparian habitats.
Yellow-breasted chat	<i>Icteria virens</i>	CSC, MSCS m	Potentially occurring in riparian habitats.
Pallid bat	<i>Antrozous pallidus</i>	CSC, USFS S, BLMS	Potentially occurring in riparian forest and woodland habitats.
Townsend's big-eared bat	<i>Plecotus townsendii</i>	CSC, USFS S	Potentially occurring in riparian forest and woodland habitats.
Western red bat	<i>Lasiurus blossevillei</i>	CSC	Potentially occurring in riparian forest and woodland habitats.
Ringtail	<i>Bassariscus astutus</i>	CP, MSCS m	Potentially occurring in riparian forest and woodland habitats.

Note:

<sup>1</sup>Status Definitions

Key:

BLMS = U.S. Bureau of Land Management sensitive

CD= California delisted

CE = California endangered

CP = California fully protected

CSC = California species of special concern

CT = California (State) listed as threatened

FB = Federal Bald and Golden Eagle Protection Act

FC = Federal candidate for listing

FD = Federally delisted

FP = Federally petitioned for listing

FPD = Proposed for Federal delisting

FT = Federally listed as threatened

m = Maintain. Ensure that any adverse effects on the species that could be associated with implementation of CALFED Bay-Delta Program actions will be fully offset through implementation of actions beneficial to the species.

MSCS = Multi-Species Conservation Strategy covered species  
r = Contribute to recovery. Implement some of the actions deemed necessary to recover species' populations in the Multi-Species Conservation Strategy focus area.

USFS M = U.S. Forest Service survey and manage species

USFS S = U.S. Forest Service sensitive

**Upper Sacramento River (Shasta Dam to Red Bluff)** A list of special-status wildlife species with potential to occur within the primary study area from Shasta Dam to RBPP was compiled based on habitat suitability and known occurrences within the Shasta Dam, Redding, Enterprise, Cottonwood, Balls Ferry, Bend, and Red Bluff East U.S. Geological Survey (USGS) 7.5-minute

quadrangle maps (CNDDB 2012, USFWS 2011). This list also includes species that are identified by USFS as sensitive or endemic, identified by BLM as sensitive, designated by the *Northwest Forest Plan* as survey and manage, or designated as MSCS covered species (see Attachment 4). Species that are federally listed or State-listed are described in more detail below and listed in Table 1-7, as are other special-status species that may occur in riparian or wetland habitats that could be affected by altered flows caused by the project.

Figures 1-8a through 1-8j show the locations of special-status wildlife species reported to the CNDDB along the Sacramento River from Shasta Dam to RBPP.

The special-status species listed in Table 1-7 were identified as having the potential to occur in the upper Sacramento River portion of the primary study area. Some species included in Table 1-7 are not expected to occur in this portion of the primary study area because of lack of suitable habitat. The following section describes special-status species that are known or are likely to occur between Shasta Dam and RBPP. Species accounts for each federally listed or State-listed species that could occur are provided below. Species accounts for nonlisted species of special concern that could occur between Shasta Dam and RBPP are provided in Attachment 4.

The five federally listed or State-listed species that could occur in the primary study area downstream from the reservoir are the following:

- Bald eagle
- Bank swallow
- Swainson's hawk
- Valley elderberry longhorn beetle
- Western yellow-billed cuckoo



**Table 1-7. Special-Status Wildlife Species Known or with Potential to Occur in the Primary Study Area, Along the Sacramento River from Shasta Dam to Red Bluff Diversion Dam**

Common Name	Scientific Name	Status	Potential for Occurrence
<b>Invertebrates</b>			
Conservancy fairy shrimp	<i>Branchinecta conservatio</i>	FE, MSCS	Unlikely to occur. No suitable habitat is present along the river corridor.
Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	FPD, FT, MSCS	Known to occur. Elderberry shrubs are present within the riparian woodland community along the Sacramento River.
Vernal pool tadpole shrimp Critical Habitat	<i>Lepidurus packardii</i>	FE, MSCS	Unlikely to occur. No suitable habitat is present along the river corridor. Critical habitat does not occur within the river corridor.
Vernal pool fairy shrimp Critical Habitat	<i>Branchinecta lynchi</i>	FT, MSCS	Unlikely to occur. No suitable habitat is present along the river corridor. Critical habitat does not occur within the river corridor.
<b>Amphibians</b>			
Shasta salamander	<i>Hydromantes shastae</i>	CT, BLM S, USFS S	Unlikely to occur. Suitable habitat generally is not found within the river corridor downstream from Shasta Dam.
California red-legged frog	<i>Rana aurora draytonii</i>	FT, CSC, MSCS	Could occur along the Sacramento River if suitable habitat is present.
Foothill yellow-legged frog	<i>Rana boylei</i>	CSC, USFS S, MSCS	Could occur along the Sacramento River if suitable habitat is present.
Western spadefoot toad	<i>Spea hammondi</i>	CSC, MSCS	Unlikely to occur. No suitable habitat is present along the Sacramento River corridor.
<b>Reptiles</b>			
Giant garter snake	<i>Thamnophis gigas</i>	FT, ST, MSCS	Unlikely to occur in the primary study area; however, known to occur in the extended study area.
Western pond turtle	<i>Actinemys (Clemmys) marmorata</i>	CSC, USFS S, MSCS	Known to occur. Suitable habitat is present in the primary study area.
<b>Birds</b>			
Cackling goose (Aleutian Canada goose)	<i>Branta hutchinsii leucopareia</i>	FD, MSCS	Unlikely to occur within banks of the Sacramento River where flows could be altered.
American peregrine falcon (nesting)	<i>Falco peregrinus anatum</i>	CP, USFS S, MSCS	Unlikely to nest in this portion of the study area; however, may forage in areas of open water with large concentrations of waterbirds.
Bald eagle (nesting and wintering)	<i>Haliaeetus leucocephalus</i>	FD, CE, CP, USFS S, MSCS	Known to occur along the Sacramento River within the primary study area.
Bank swallow (nesting)	<i>Riparia riparia</i>	CT, MSCS	Known to occur along the Sacramento river in the primary and extended study areas.

**Table 1-7. Special-Status Wildlife Species Known or with Potential to Occur in the Primary Study Area, Along the Sacramento River from Shasta Dam to Red Bluff Diversion Dam (contd.)**

Common Name	Scientific Name	Status	Potential for Occurrence
<b>Birds (contd.)</b>			
Black-crowned night heron (rookery)	<i>Nycticorax nycticorax</i>	BLM S, MSCS	Could nest in trees adjacent to the Sacramento River.
California gull (nesting colony)	<i>Larus californicus</i>	MSCS	Not within breeding range. Could occur in the study area during winter or migration.
Cooper's hawk (nesting)	<i>Accipiter cooperii</i>	MSCS	Could occur. Suitable nesting and foraging habitat is present in the study area.
Double-crested cormorant (rookery)	<i>Phalacrocorax auritus</i>	MSCS	Could nest in trees adjacent to the Sacramento River.
Golden eagle	<i>Aquila chrysaetos</i>	CP, BLM S, MSCS	No suitable nesting habitat along the Sacramento River. Unlikely to forage along the river corridor.
Great blue heron (rookery)	<i>Ardea herodias</i>	MSCS	Could nest in trees adjacent to the Sacramento River.
Great egret (rookery)	<i>Casmerodius albus</i>	MSCS	Could nest in trees adjacent to the Sacramento River.
Greater sandhill crane (nesting and wintering)	<i>Grus canadensis tabida</i>	CT, CP, MSCS	Unlikely to breed in the study area. Unlikely to use the Sacramento River corridor during winter or migration.
Least bittern (nesting)	<i>Ixobrychus exilis</i>	CSC, MSCS	Could nest along the Sacramento River if suitable habitat is present.
Lesser sandhill crane (wintering)	<i>Grus canadensis canadensis</i>	CSC	Does not breed in California. Unlikely to use the Sacramento River corridor during winter or migration.
Little willow flycatcher (nesting)	<i>Empidonax traillii brewsteri</i>	CE, MSCS	Unlikely to breed in the study area due to elevation, but may use riparian woodlands during migration.
Loggerhead shrike (nesting)	<i>Lanius ludovicianus</i>	CSC	Likely to nest and forage in woodlands and scrub habitats in the study area.
Long-billed curlew (nesting)	<i>Numenius americanus</i>	MSCS	Does not breed in the study area. Unlikely to use the Sacramento River corridor during winter or migration.
Long-eared owl (nesting)	<i>Asio otus</i>	CSC, MSCS	Does not nest in lowland Central Valley areas. Unlikely to forage along the Sacramento River corridor where flows would be altered.
Northern harrier (nesting)	<i>Circus cyaneus</i>	CSC, MSCS	Likely to occur. Suitable nesting and foraging habitat is present in the study area.



**Table 1-7. Special-Status Wildlife Species Known or with Potential to Occur in the Primary Study Area, Along the Sacramento River from Shasta Dam to Red Bluff Diversion Dam (contd.)**

Common Name	Scientific Name	Status	Potential for Occurrence
<b>Birds (contd.)</b>			
Northern spotted owl (nesting) Critical Habitat	<i>Strix occidentalis caurina</i>	FT, MSCS	Unlikely to occur along the Sacramento River corridor due to lack of suitable habitat. Critical habitat does not occur in the project area.
Osprey (nesting)	<i>Pandion haliaetus</i>	MSCS	Known to nest along the Sacramento River within the primary study area.
Purple martin (nesting)	<i>Progne subis</i>	CSC	Could occur. Potentially suitable habitat is present along the Sacramento River corridor.
Short-eared owl (nesting)	<i>Asio flammeus</i>	CSC, MSCS	Could occur. Potentially suitable habitat is present within the primary study area.
Snowy egret (rookery)	<i>Egretta thula</i>	MSCS	Could nest in trees adjacent to the Sacramento River.
Swainson's hawk (nesting)	<i>Buteo swainsoni</i>	CT, USFS S, MSCS	Could occur. Suitable nesting and foraging habitat is present in the study area.
Tricolored blackbird (nesting colony)	<i>Agelaius tricolor</i>	CSC, MSCS	Could occur. Potentially suitable habitat is present in the primary study area.
Western yellow-billed cuckoo (nesting)	<i>Coccyzus americanus occidentalis</i>	FT, CE, USFS S, MSCS	Likely to nest and forage in the primary study area.
Western burrowing owl (burrow sites)	<i>Athene cunicularia hypugea</i>	CSC, MSCS	Unlikely to occur along the Sacramento River corridor due to a lack of suitable nesting habitat.
White-tailed kite (nesting)	<i>Elanus leucurus</i>	CP, MSCS	Likely to occur. Suitable nesting and foraging habitat is present in the study area.
Yellow-breasted chat (nesting)	<i>Icteria virens</i>	CSC, MSCS	Likely to nest and forage in the primary study area
Yellow warbler (nesting)	<i>Setophaga (Dendroica) petechia</i>	CSC, MSCS	Could nest and forage in the primary study area. Likely to use riparian woodlands during migration.

**Table 1-7. Special-Status Wildlife Species Known or with Potential to Occur in the Primary Study Area, Along the Sacramento River from Shasta Dam to Red Bluff Diversion Dam (contd.)**

Common Name	Scientific Name	Status	Potential for Occurrence
<b>Mammals</b>			
Pacific fisher	<i>Martes pennanti</i>	FC, CSC, USFS S	Unlikely to occur. No suitable habitat along the Sacramento River corridor.
Pallid bat	<i>Antrozous pallidus</i> (roosting)	CSC, BLM S, USFS S	Could occur. Potentially suitable habitat is present in woodland in the primary study area.
Ringtail	<i>Bassariscus astutus</i>	CP, MSCS	Could occur. Potentially suitable habitat is present along the Sacramento River corridor.
Western mastiff bat (roosting)	<i>Eumops perotis</i> <i>californicus</i>	CSC, BLM S, MSCS	Unlikely to roost along the Sacramento River corridor because suitable roost sites are lacking.
Western red bat	<i>Lasiurus blossevillii</i>	CSC, USFS S	Could occur. Potentially suitable habitat is present in woodland in the primary study area.
Sierra Nevada red fox	<i>Vulpes vulpes necator</i>	CT, USFS S	Unlikely to occur within the project area because the vegetation communities are different than preferred and the area is generally below the preferred elevation range.

Sources: CNDDB 2012; USFWS 2011; USFS 2007; CALFED 2000a; Shuford and Gardali 2008

Key:

BLM S = U.S. Bureau of Land Management sensitive

CE = California endangered

CP = California fully protected

CSC = California species of special concern

CT = California Threatened

FC = Federal candidate for listing

FD = Federally delisted

FE = Federally listed as endangered

FPD = Proposed for Federal delisting

FT = Federally listed as threatened

MSCS = Multi-Species Conservation Strategy covered species

USFS S = USFS sensitive



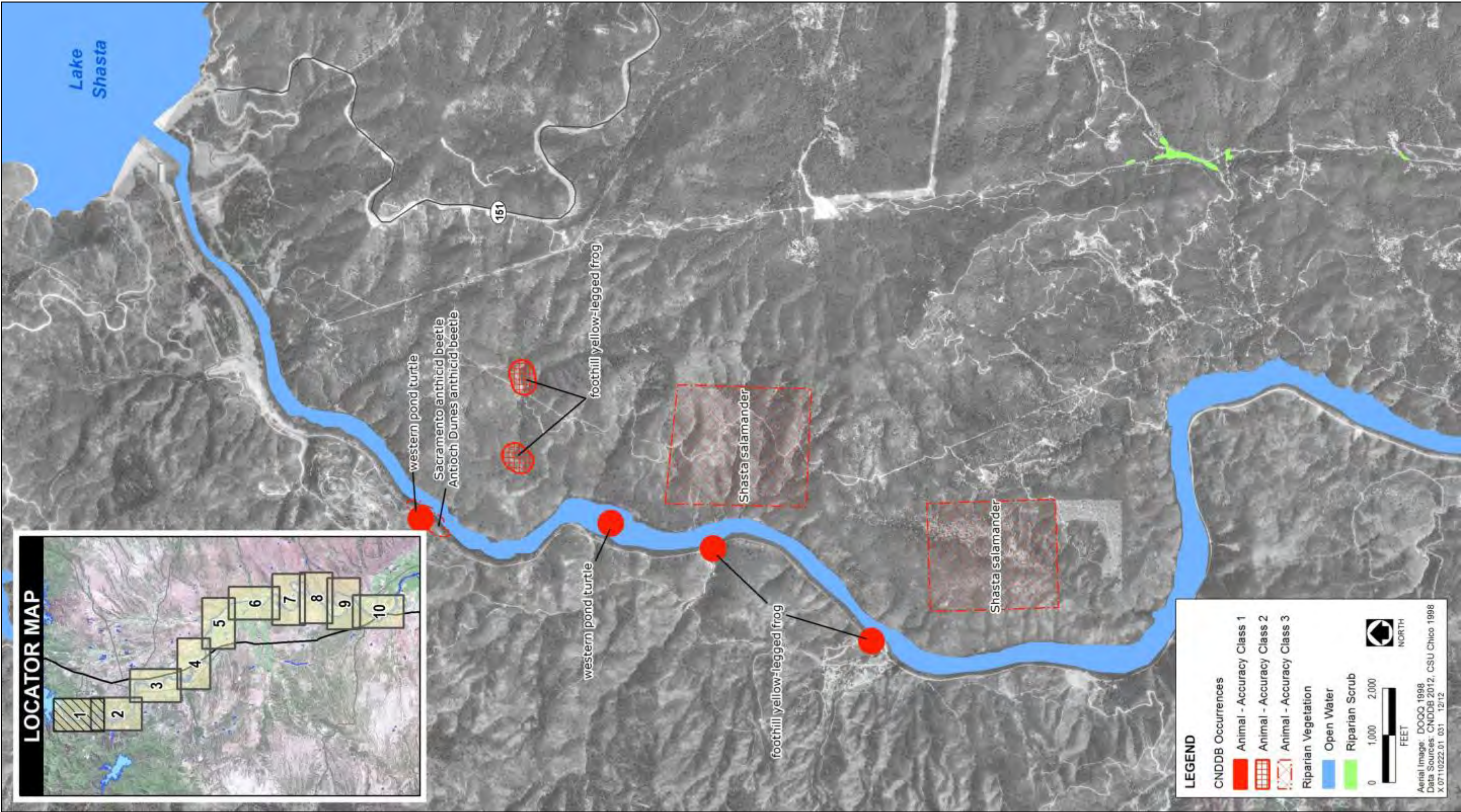
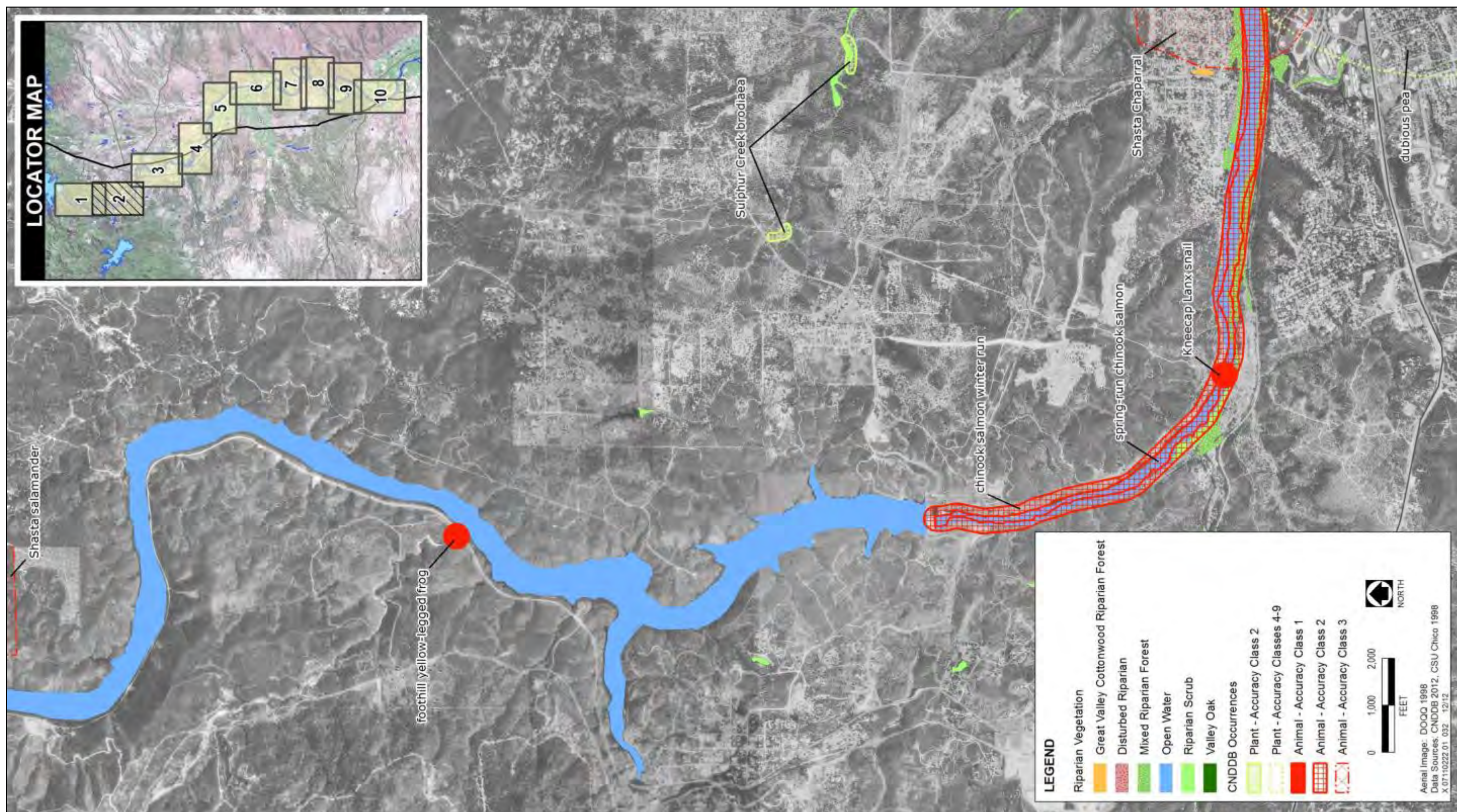


Figure 1-8a. Sensitive Biological Resources Between Shasta Dam and Red Bluff Pumping Plant



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**Figure 1-8b. Sensitive Biological Resources Between Shasta Dam and Red Bluff Pumping Plant**



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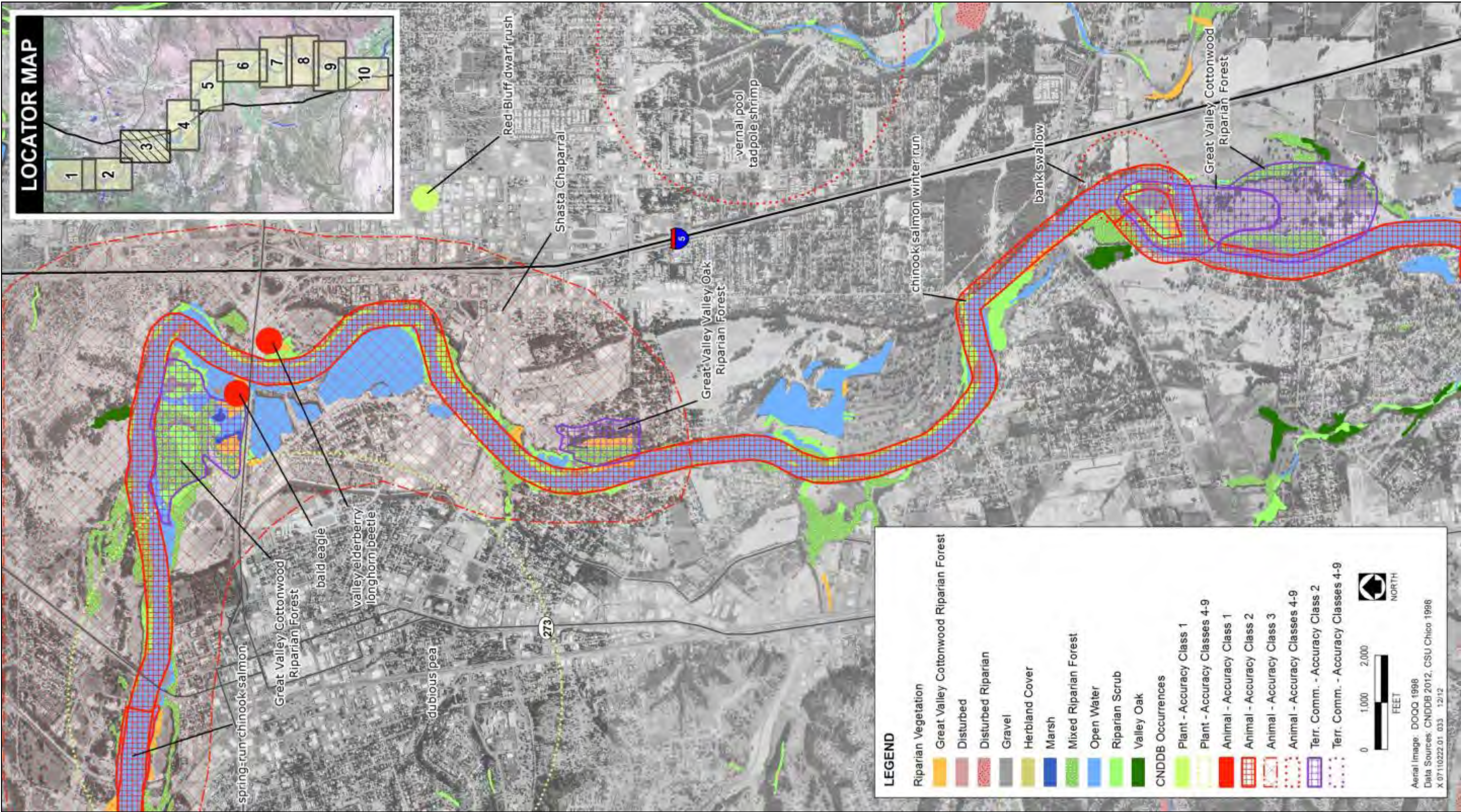


Figure 1-8c. Sensitive Biological Resources Between Shasta Dam and Red Bluff Pumping Plant



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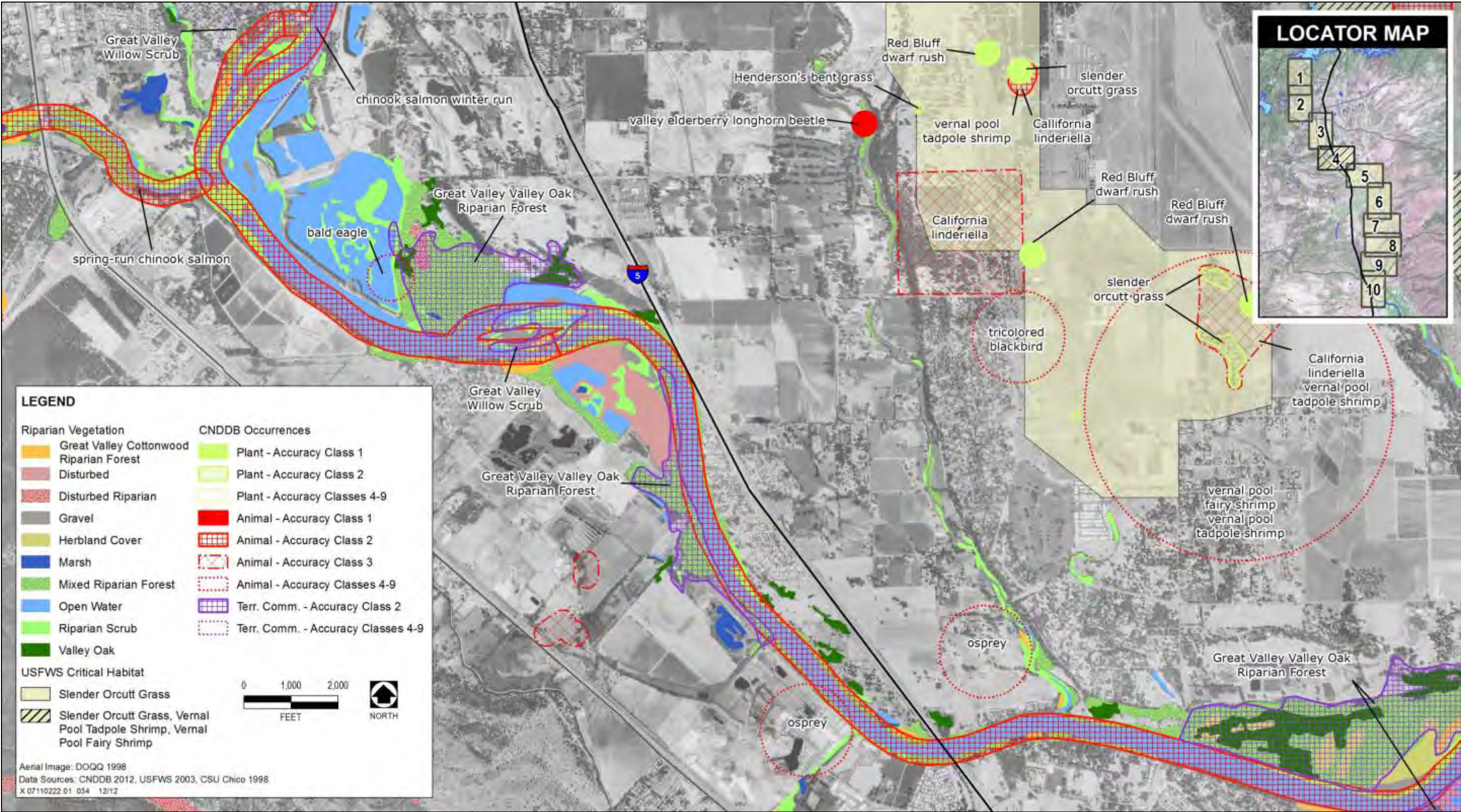


Figure 1-8d. Sensitive Biological Resources Between Shasta Dam and Red Bluff Pumping Plant



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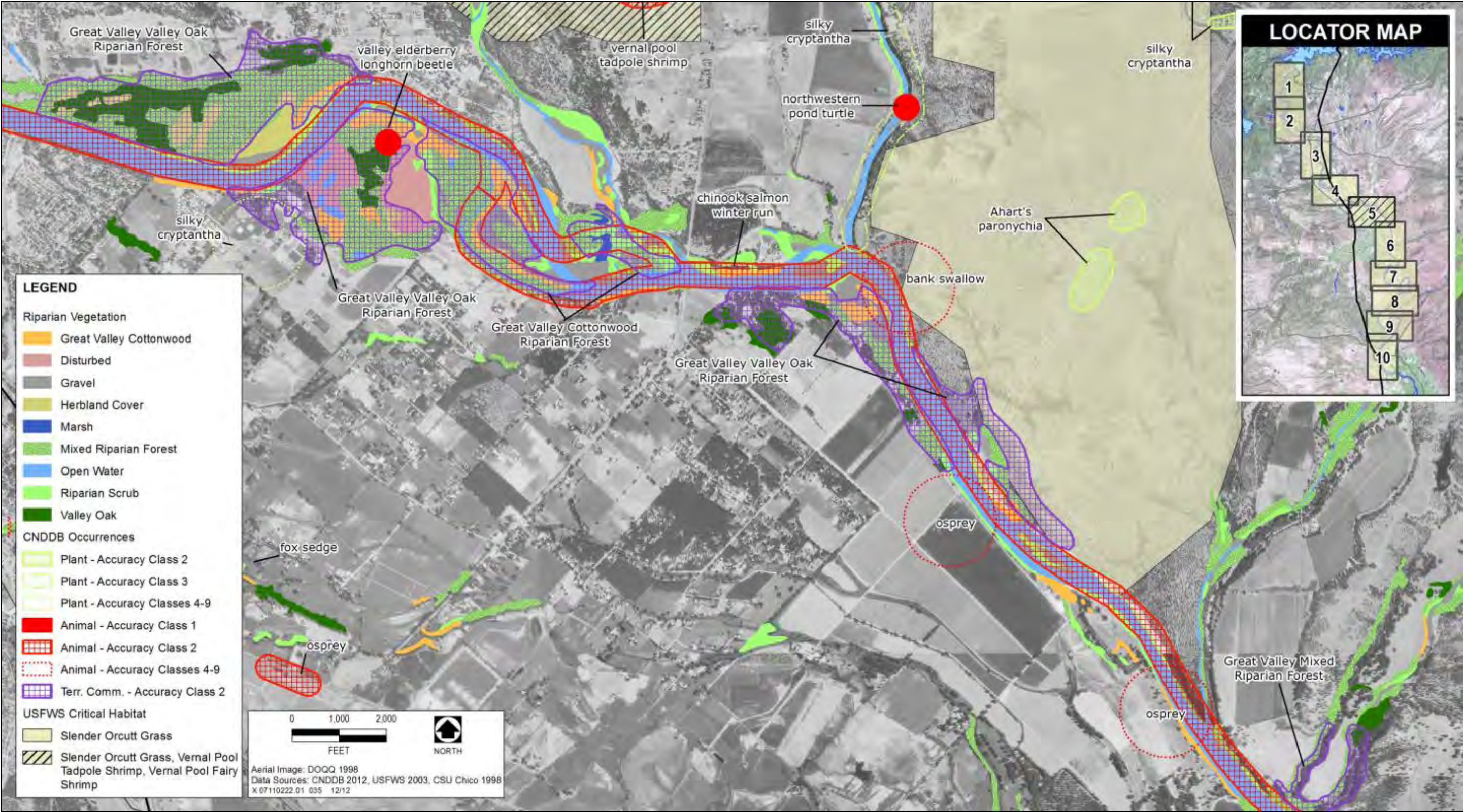


Figure 1-8e. Sensitive Biological Resources Between Shasta Dam and Red Bluff Pumping Plant



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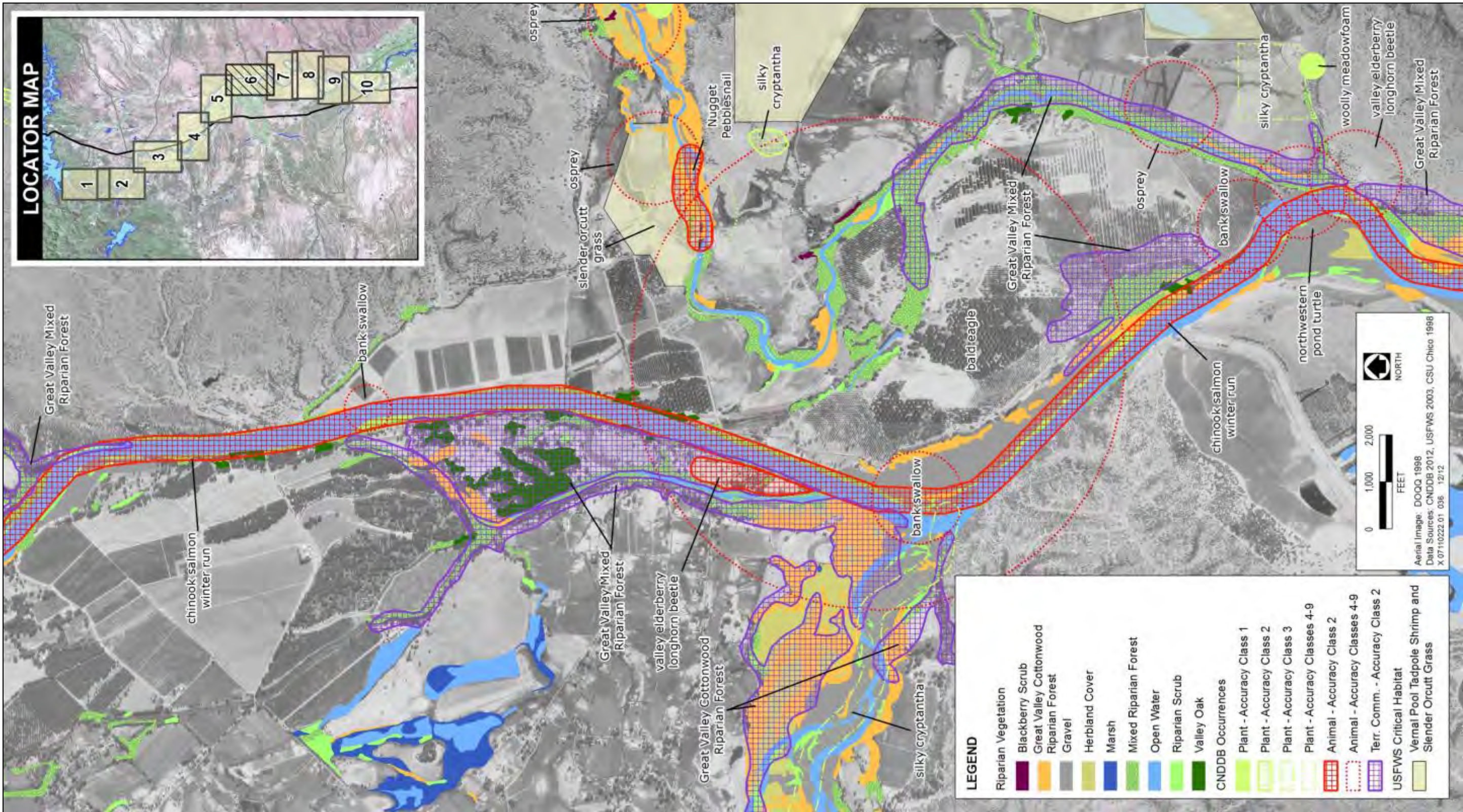


Figure 1-8f. Sensitive Biological Resources Between Shasta Dam and Red Bluff Pumping Plant



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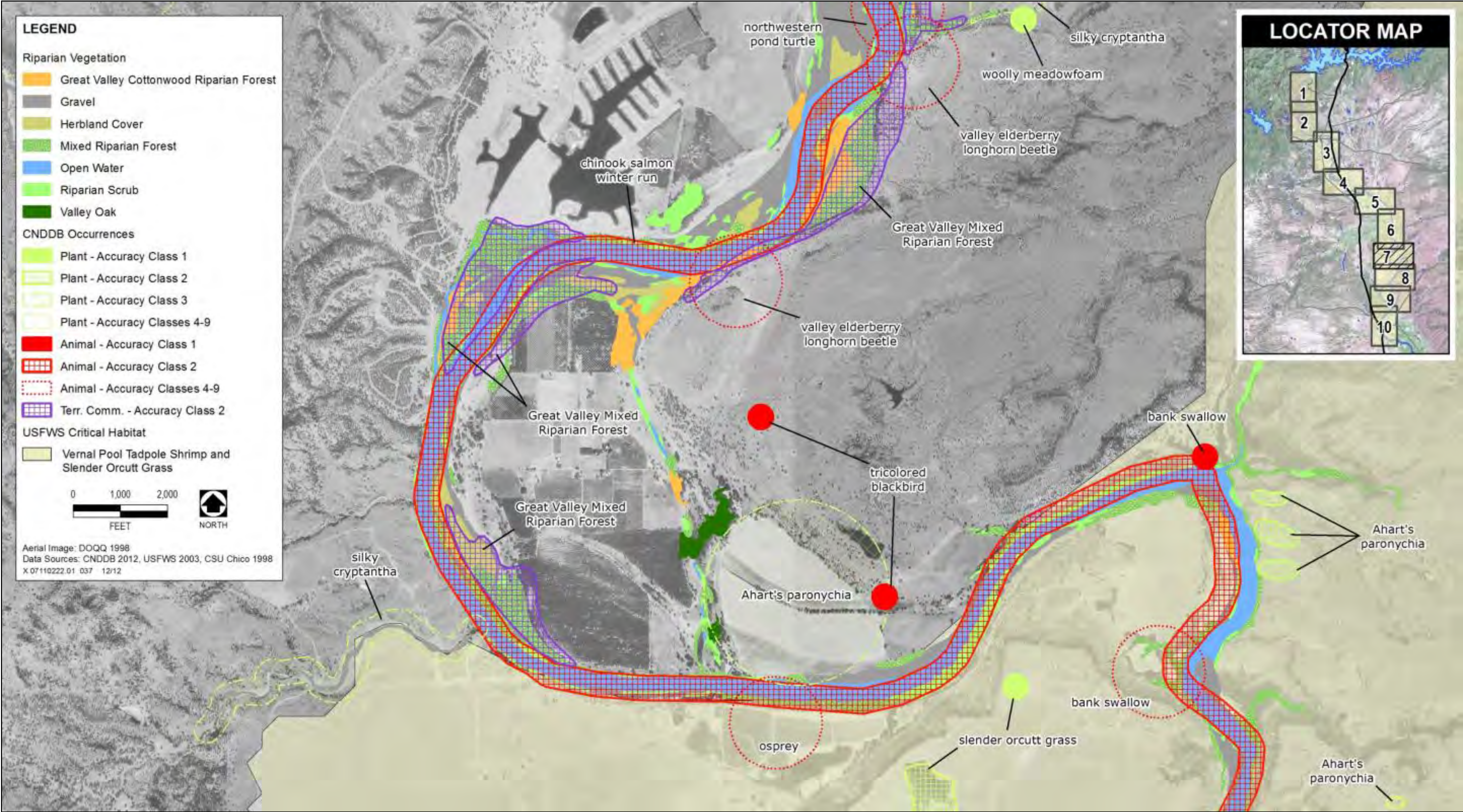


Figure 1-8g. Sensitive Biological Resources Between Shasta Dam and Red Bluff Diversion Dam



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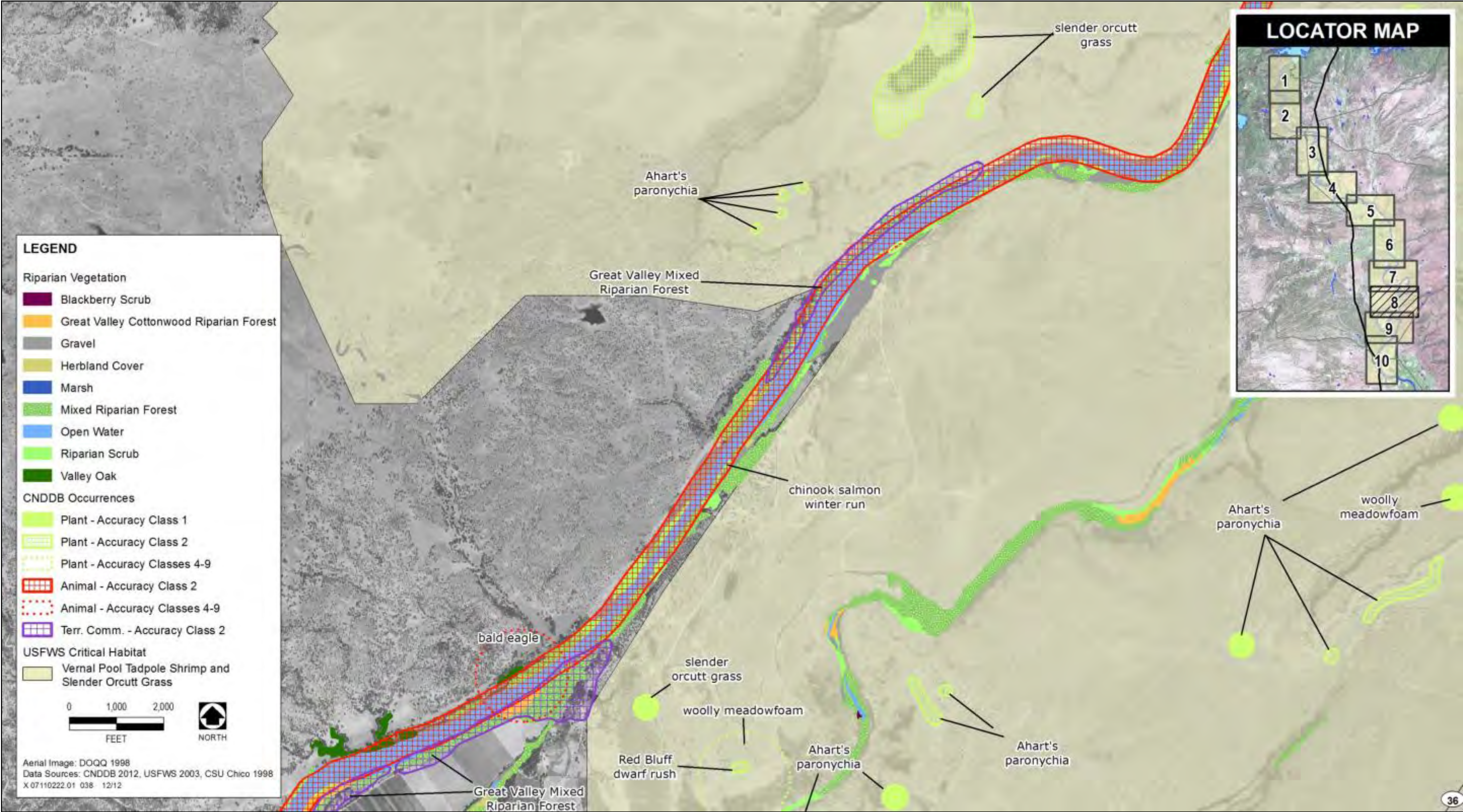


Figure 1-8h. Sensitive Biological Resources between Shasta Dam and Red Bluff Pumping Plant

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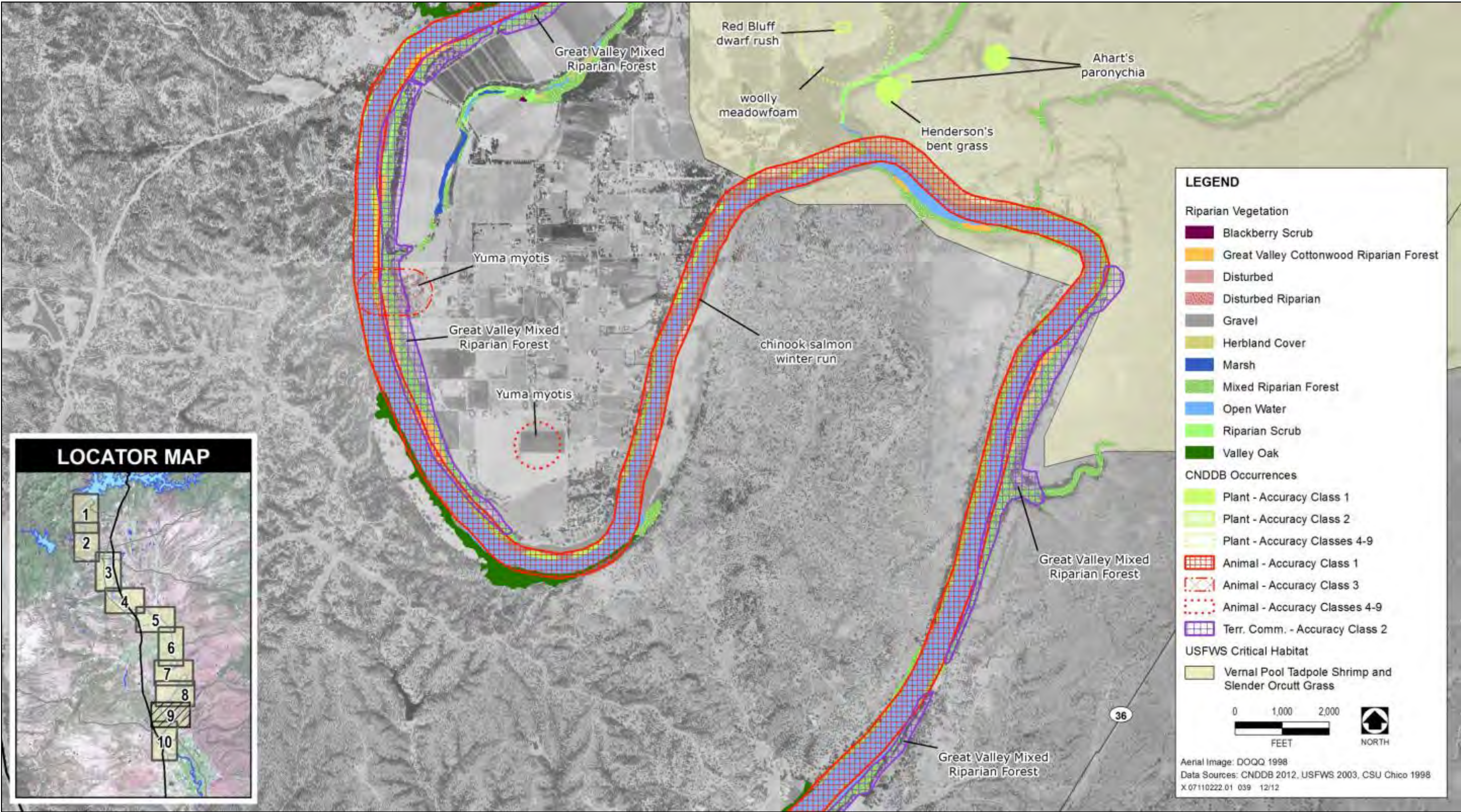


Figure 1-8i. Sensitive Biological Resources between Shasta Dam and Red Bluff Pumping Plant



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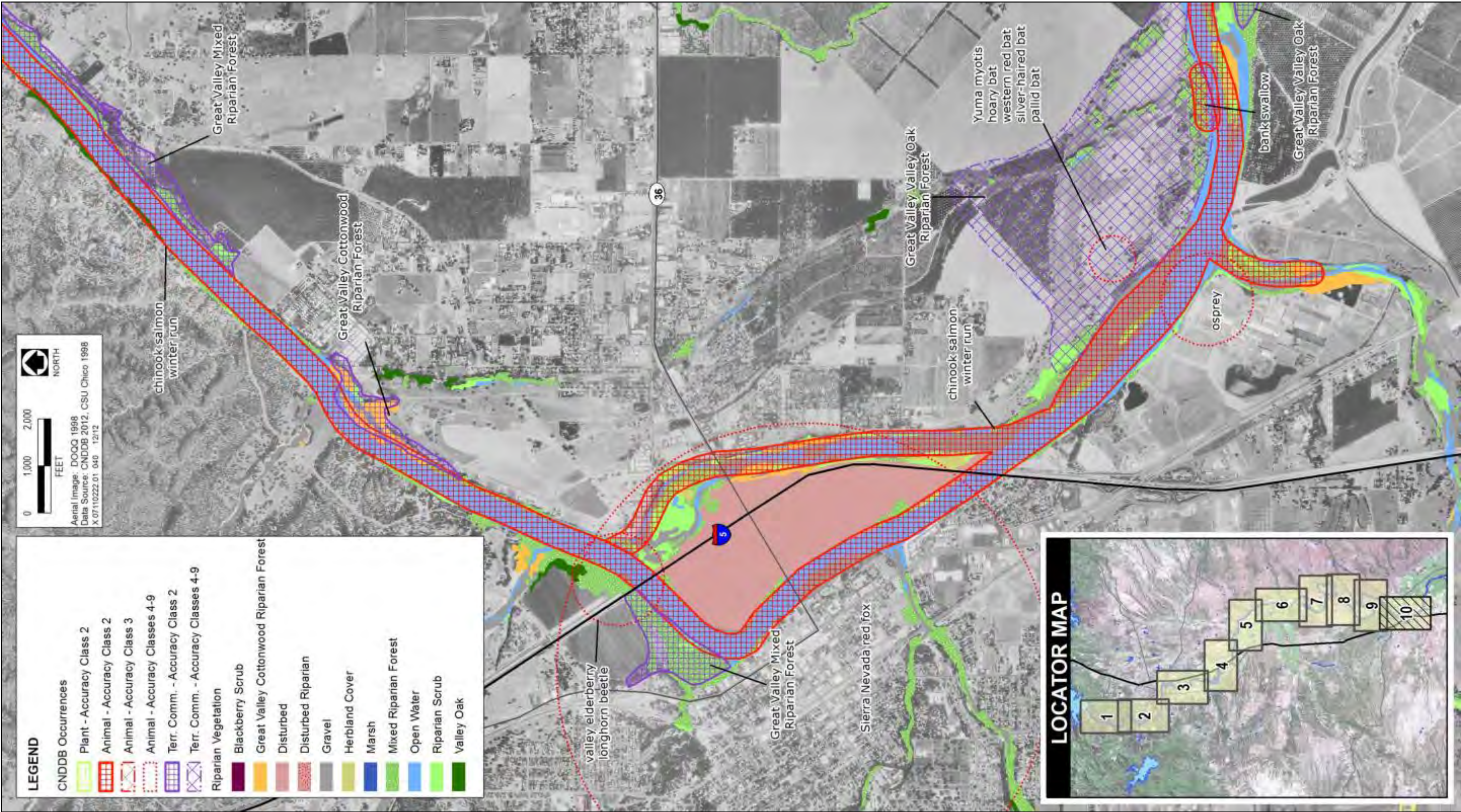


Figure 1-8j. Sensitive Biological Resources between Shasta Dam and Red Bluff Diversion Dam



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*Bald Eagle* The bald eagle has been delisted from the Federal Endangered Species Act (ESA), but is still listed as endangered under the California Endangered Species Act (CESA). This species nests in tall trees or on cliffs near rivers and lakes. It nests in Siskiyou, Modoc, Trinity, Shasta, Lassen, Plumas, Butte, Tehama, Lake, and Mendocino counties and in the Tahoe basin. The species' winter range includes the rest of California, except the southeastern deserts, very high altitudes in the Sierra Nevada, and east of the Sierra Nevada south of Mono County. Bald eagles are also known to nest along the riparian corridor of the primary study area.

*Bank Swallow* The bank swallow is State-listed as threatened. This species nests in bluffs or banks, usually adjacent to water. It occurs along the Sacramento River from Tehama County to Sacramento County, along the Feather and lower American rivers, in the Owens Valley, and in the plains east of the Cascade Range in Modoc, Lassen, and northern Siskiyou counties. Small populations of this species are also found near the coast from San Francisco County to Monterey County. It is known to occur in at least 7 locations along the Sacramento River in the primary study area, and extant populations are reported in approximately 100 locations in the extended study area (CNDDDB 2012).

Bank swallow was identified as one of two wildlife indicator species (the other being western pond turtle) in the "Linkages Report" for the Sacramento River Ecological Flows Study (Stillwater Sciences 2007). The goal of this study was to define how flow characteristics and associated management actions influence the creation and maintenance of habitats for a number of native species that occur in the Sacramento River corridor. Bank erosion is an important habitat feature for bank swallows to find suitable nesting sites. Erosion in the winter resulting from high volume and/or velocity flows is important to create nesting habitat. However, high flows during the breeding season (beginning in late March), when bank swallow nests may be present, can cause banks to erode and result in nest destruction. Flood control and bank protection projects can also reduce bank swallow habitat availability. The following information about bank swallow is excerpted from the report:

*There has been a general decline in the total number of bank swallow burrows, colonies, and estimated breeding pairs found between Redding and Verona (RM (River Mile) 292–81) since 1986. The Sacramento River and its tributaries harbor approximately 70 percent of California's bank swallow nesting locations (Hight 2000).*

*High flows during nesting season are generally infrequent in the Sacramento River but nevertheless have the potential to adversely affect bank swallow colonies. Although there is general disagreement on the exact magnitude of the flow required to initiate substantial bank erosion, growing evidence*

*suggests that flows in the 20,000–25,000 cfs [cubic feet per second] range will typically erode some banks, causing partial bank collapse that can result in localized nest failure if swallows are present. Flows above 50,000–60,000 cfs are almost certain to cause widespread bank erosion. This can lead to partial or complete colony failure at many sites if breeding bank swallows are present.*

The installation of riprap and concrete in bank armoring activities can have the immediate effect of reducing the availability of sufficiently steep, suitably textured habitat for bank swallow nesting colonies. Overall, an estimated 48 percent of the channel from Red Bluff to Colusa (RM 243–143) is now covered by riprap on at least one side (Larsen and Greco 2002; S. Greco, unpublished data). However, bank revetment has been preferentially applied to actively migrating bends which would otherwise be among the most suitable sites for bank swallow nests. Hence, it is likely that bank revetment has eliminated substantially more than 48 percent of potential nesting sites between Red Bluff and Colusa. Plans for new bank revetment projects on the Sacramento River continue to be developed. If implemented, these projects would further reduce available habitat, and thus add to the already high overall effect of bank revetment on the bank swallow population (Schlorff 2004).

A levee-removal project was completed on the mainstem Sacramento River at RM 233 in late fall 1999 (Golet et al. 2003). Erosion in the mid-1990s had already damaged and washed out the riprap that had been installed at the site by the landowner. Further erosion in the winter of 2000 expanded the existing cut bank, and a swallow colony was established there in the following spring. The newly established colony, with 2,770 burrows, was the largest on the river that year. It represented a substantial expansion for bank swallows at the site, which had supported just 930 burrows in the previous year.

*Swainson's Hawk* Swainson's hawk is State-listed as a threatened species. This species nests in oaks or cottonwoods in or near riparian habitats, and it forages in grasslands, irrigated pastures, and grain fields. This species occurs throughout the lower Sacramento and San Joaquin valleys, the Klamath basin, and Butte Valley. Potential nest trees for this species occur along the riparian corridor of the primary study area.

*Valley Elderberry Longhorn Beetle* The valley elderberry longhorn beetle is federally listed as threatened. Its obligate host plant, the elderberry (*Sambucus* sp.), occurs in riparian and oak savanna habitats below 3,000 feet throughout the Central Valley. This species is known to occur in several locations along the riparian corridor of the primary study area. Potential habitat (i.e., the elderberry shrub) is a common component of riparian communities in the study area.

*Western Yellow-Billed Cuckoo* The western yellow-billed cuckoo is federally listed as threatened and is State-listed as endangered. It inhabits wide, dense



riparian forest and scrub where there is a thick understory of willows for nesting. It prefers sites with a dominant cottonwood overstory for foraging. It may avoid valley-oak riparian habitats where scrub jays are abundant. This species nests along the upper Sacramento, lower Feather, south fork of the Kern, Amargosa, Santa Ana, and Colorado rivers.

*State Species of Special Concern* Several State species of special concern (i.e., purple martin, yellow warbler, and yellow-breasted chat) are likely or are known to occur in riparian habitats in the primary study area. Other State species of special concern (i.e., least bittern, northern harrier, short-eared owl, tricolored blackbird, and western pond turtle) are likely or known to be found in emergent wetlands and marsh habitats adjacent to the riparian corridor of the primary study area. Open woodlands or scrub vegetation could provide nesting habitat for loggerhead shrike and white-tailed kite and denning or roosting habitat for pallid bat, ringtail, and western red bat.

Of particular importance along the Sacramento River corridor is the western pond turtle, which serves as an indicator species because it uses many of the habitat types along the river corridor (Stillwater Sciences 2007). The western pond turtle is California's only native freshwater turtle. The habitat needs of this species are diverse. Along major alluvial river systems, such as the Sacramento River, it uses oxbow lakes, sloughs, and other off-channel water bodies for foraging and rearing. Main-channel habitats are used for aquatic dispersal and at least occasionally for foraging and basking. Upland areas, including grasslands, oak woodlands, and gaps in riparian forests, also are used for nesting, dispersal, and overwintering. Thus, the habitats of western pond turtles are used by many species, which together contribute to the overall diversity of wildlife along the Sacramento River corridor. Western pond turtle habitats have likely been reduced in extent and quality from historical conditions as a function of land use changes that have converted habitat to agriculture and urban development. They have also likely been reduced as a result of dam construction and operations; by altering flow and sediment regimes, dam construction and operations have reduced bank erosion and meander migration, thereby affecting the formation of off-channel habitats that appear to provide the majority of the aquatic habitat for western pond turtle in the Sacramento River corridor (Stillwater Sciences 2007).

### ***Extended Study Area***

The extended study area consists of the lower Sacramento River and Delta, major tributaries and floodplain bypasses, and the CVP/SWP service areas. Habitats in each of these areas are described below. Special-status wildlife species associated with habitat in these areas are also discussed.

**Lower Sacramento River and Delta** The roughly 300 miles of the Sacramento River can be subdivided into distinct reaches. These reaches are discussed separately below because of differences in morphology, riparian vegetation, and habitat functions. This section focuses on the reaches of the mainstem Sacramento River from RBPP to Colusa, from Colusa to the Delta,

and in the Delta. Each of these reaches is discussed individually along with the main tributaries and floodplain bypasses to the Sacramento River. (See the *Fisheries and Aquatic Ecosystem Technical Report* for more information.)

*Lower Sacramento River Red Bluff Diversion Dam to Colusa* In this reach, the Sacramento River is classified as a meandering river, where relatively stable, straight sections alternate with more sinuous, dynamic sections (Resources Agency 2003). The active channel is fairly wide in some stretches and the river splits into multiple forks at many different locations, creating gravel islands often with riparian vegetation. Historic bends in the river are visible throughout this reach and appear as scars of the historic channel locations with the riparian corridor and oxbow lakes still present in many locations. Well-developed riparian woodland occurs in many locations. The channel remains active and has the potential to migrate in times of high water. Point bars, islands, high and low terraces, instream woody cover, early successional riparian plant growth, and other evidence of river meander and erosion are common in this reach.

*Colusa to the Delta* The general character of the Sacramento River changes quite drastically downstream from Colusa from a dynamic and active meandering channel to a confined, narrow channel restricted from migration. Surrounding agricultural lands encroach directly adjacent to the levees, which have cut the river off from the majority of its riparian corridor, especially on the eastern side of the river. The majority of the levees in this reach are lined with riprap, allowing the river no erodible substrate and limiting the extent of riparian vegetation.

*Primary Tributaries to the Lower Sacramento River* Primary tributaries to the lower Sacramento River are the Feather and American rivers; each is described separately below.

*Lower Feather River* The aquatic and riparian ecosystems of the lower Feather River are influenced by DWR Oroville Facilities downstream to the confluence with the Sacramento River at Verona. The upper extent is fairly confined by levees as it flows through the city of Oroville. Downstream from Oroville, the Feather River is fairly active and meanders its way south to Marysville. However, this stretch is bordered by active farmland, which confines the river into an incised channel in certain stretches and limits the width of riparian woodland. Relatively large areas of adjacent farmlands are in the process of being restored to floodplain habitat with the relocation of levees to become setback levees.

*Lower American River* The lower American River (downstream from Folsom and Nimbus dams) is fairly low gradient and provides a variety of aquatic and riparian habitats. The majority of the lower American River is surrounded by the American River Parkway, preserving the surrounding riparian zone. The river channel does not migrate to a large degree because of



the geologic composition that has allowed the river to incise deep into sediments, leaving tall cliffs and bluffs adjacent to the river.

*Sacramento River Floodplain Bypasses* There are multiple water diversion structures in the lower Sacramento River that move floodwaters into floodplain bypass areas during high-flow events. Primary floodplain bypass areas include the Butte basin, Sutter Bypass, and Yolo Bypass. These bypasses provide broad, inundated floodplain habitat during wet years. Unlike other Sacramento River and Delta habitats, floodplains and floodplain bypasses are seasonally dewatered (as high flows recede) during late spring through autumn and provide important habitat for migrating waterfowl and shorebirds.

*Lower San Joaquin and Stanislaus Rivers* The lower San Joaquin River is characterized by a relatively wide (approximately 300 feet) channel with little canopy or overhead vegetation and minimal bank cover. Aquatic habitat in the San Joaquin River is characterized primarily by slow-moving water and with limited water clarity and overall low habitat diversity. Aquatic and riparian habitats of the downstream portions of the Stanislaus River are more varied, in association with the development of levees and encroachment of agriculture and urban uses. Flows in both river systems are highly altered and are managed for flood control and water supply purposes.

**Special-Status Species** Most of the special-status wildlife species listed in Table 1-7 have the potential to occur within the extended study area. Numerous additional special-status wildlife species could occur in the extended study area in plant communities that are not present in the primary study area. The potential occurrence of special-status wildlife species is given for each section of the primary and extended study areas in Attachment 6. Additional species that are endemic to the Bay-Delta area, the Delta proper, or the Coast Range, as well as other species whose distribution ranges do not extend into the primary study area could occur in the extended study area. Attachment 7 contains a comprehensive list of all sensitive wildlife species in the extended study area that have been reported to the CNDDDB.

*Sacramento River from RBPP to the Delta* Many of the special-status wildlife species described above for the upper Sacramento River corridor have the potential to occur in the middle and lower reaches of the Sacramento River.

Before the habitat and community changes that resulted from human settlement and development along the Sacramento River, several animals were present that have since been extirpated from the region. However, numerous special-status wildlife species still occur along the Sacramento River from RBPP to the Delta. The majority of the special-status wildlife species are associated with grasslands, freshwater emergent wetlands, lakes, rivers, and riparian vegetation on the valley floor. Many of these species have been listed by Federal and State wildlife agencies because of habitat loss associated with agricultural development and water projects. Wildlife species listed under the Federal ESA

and/or CESA that have potential to occur in a portion of the extended study area from RBPP to the Delta include valley elderberry longhorn beetle, giant garter snake (*Thamnophis gigas*), bald eagle, Swainson's hawk, western yellow-billed cuckoo, willow flycatcher, and bank swallow. Information about these and other special-status species is provided in the CALFED MSCS (CALFED 2000a).

*Sacramento-San Joaquin River Delta* Many special-status species are known or are likely to occur in the Delta because of the presence of unique wetland habitats there. Generally, the existing distribution of wildlife species in the Delta is closely linked with the distribution of one or more habitat types on which a species depends. Dozens of special-status wildlife occur in the Delta region. Most of the special-status wildlife species are associated with freshwater emergent wetlands, marshes, open water, and agricultural lands. Tidal marshes and emergent wetlands support several special-status wildlife species, including the California black rail (*Laterallus jamaicensis coturniculus*), California clapper rail (*Rallus longirostris obsoletus*), greater sandhill crane, salt marsh common yellowthroat (*Geothlypis trichas sinuosa*), salt marsh harvest mouse (*Reithrodontomys raviventris*), Suisun ornate shrew (*Sorex ornatus sinuosus*), Suisun song sparrow (*Melospiza melodia maxillaris*), and tricolored blackbird. The giant garter snake is known to inhabit sloughs, canals, and low-gradient streams and freshwater marshes in the Delta. Vernal pools and other freshwater seasonal wetlands support several special-status crustaceans, including vernal pool tadpole shrimp and vernal pool fairy shrimp. Although it is severely declining because of a dramatic shrinkage of suitable habitat, the valley elderberry longhorn beetle has been found in the Delta region on McCormack-Williamson and New Hope Tracts. Information about these and other special-status species is provided in the CALFED MSCS and Ecosystem Restoration Program Plan (CALFED 2000a, 2000b) and the Baylands Ecosystem Species and Community Profiles (Goals Project 2000).

*San Joaquin River Basin to the Delta* Changes in the natural landscape of the San Joaquin River region have substantially affected plant and wildlife species. Thus, the current wildlife habitat value of this area is somewhat limited by the predominance of agricultural lands, which support a relatively low diversity of wildlife species. Because animals are highly dependent on specific habitats, changes in the quality and quantity of various habitat types have affected the area of habitat for many wildlife species. Conversion of grasslands to row crops has favored species that have adapted to the use of agricultural fields for foraging and species that can thrive in the altered landscape; however, many special-status wildlife species live in the periphery of these areas.

Remnant patches of native vegetation are likely to support a high diversity of wildlife species. More than 100 special-status wildlife and plants occur in the San Joaquin River region. The largest number of special-status plant species occurs in grassland and valley foothill woodland. Most of the special-status wildlife species are associated with grasslands (which include vernal pools), freshwater emergent wetlands, lakes, and rivers that occur on the valley floor.



Many of these special-status species have been listed by Federal and State wildlife agencies because of habitat losses associated with agricultural development and water projects. Information on these and other special-status species is provided in the CALFED MSCS (CALFED 2000a).

**CVP/SWP Service Areas** The CVP/SWP service areas are dominated by agricultural land and urban development, which can support many wildlife species, most of which are highly adapted to these disturbed environments. The conflict between urban growth and conservation of native habitat has resulted in the listing of a number of wildlife species that have been threatened with extinction. Many of these special-status wildlife species are unable to adapt to other habitat types or altered habitat conditions. The region also supports a variety of nonnative species, some of which are detrimental to survival of native species. Generally, the lowest diversity of native wildlife species occurs in densely urbanized areas. Special-status wildlife occurs in both large and small blocks of habitat, while some large mammals and secretive species are generally found only on large undisturbed parcels.

Changes in the natural landscape in the CVP/SWP service areas greatly reduced the distribution and abundance of wildlife species. The California condor (*Gymnogyps californianus*), lightfooted clapper rail (*Rallus longirostris levipes*), California least tern (*Sternula antillarum brownie*), least Bell's vireo (*Vireo bellii pusillus*), Belding's savannah sparrow (*Passerculus sandwichensis beldingi*), southwestern willow flycatcher (*Empidonax traillii extimus*), California gnatcatcher (*Polioptila californica*), Mohave ground squirrel (*Spermophilus mohavensis*), and Morro Bay kangaroo rat (*Dipodomys heermanni morroensis*) are examples of species that have been listed as threatened or endangered under the ESA and/or CESA and could occur within the CVP/SWP service areas. Attachments 6 and 7 provide tables listing the special-status wildlife species with potential to occur in, or reported to the CNDDDB from, the CVP/SWP service areas.

## Other Wildlife Resources

### ***Shasta Lake and Vicinity***

**Critical Deer Range** Critical black-tailed deer winter range for the McCloud Flats and Cow Creek herds is located in the Shasta Lake and vicinity portion of the primary study area in all five arms of the lake. Critical fawning range also is found along the south-facing slopes of Little Sugarloaf Creek (CDFG 1998). Critical deer winter range can include movement corridors, staging areas where deer congregate, and habitats with high-quality winter forage or other elements that help deer to survive the winter. Winter ranges are at lower elevations and are fewer in number than summer ranges, and thus are more vulnerable to human impact. Deer from different summer ranges may use common winter ranges when breeding typically occurs, which contributes to genetic diversity (CDFG 1998).

**USFWS HEP Analysis** Reclamation is working with USFWS to complete a Habitat Evaluation Procedure (HEP) analysis to help quantify potential project impacts and meet Fish and Wildlife Coordination Act consultation requirements. To date, HEP studies and analyses have been completed for part of the Shasta Lake and vicinity portion of the primary study area. Additional planning and coordination are ongoing.

**Incidental Observations** Reclamation has maintained a database of special-status wildlife species incidentally observed during all biological surveys performed since 2002. The incidental species observations include the foothill yellow-legged frog, western pond turtle (*Actinemys marmorata marmorata*), osprey (*Pandion haliaetus*), yellow-breasted chat (*Icteria virens*), and yellow warbler (*Dendroica petechia brewsteri*) (Figures 1-4a through 1-4f).

**Upper and Lower Sacramento River, Delta, and CVP/SWP Service Areas** For the upper and lower Sacramento River, Delta, and CVP/SWP service areas, no other wildlife resources were evaluated in addition to wildlife habitats, wildlife, and special-status wildlife.

## Regulatory Framework

Wildlife resources in California are protected and/or regulated by a variety of Federal and State laws and policies. Key regulatory and conservation planning issues applicable to the project are discussed below.

### Federal

#### **Federal Endangered Species Act**

Pursuant to the Federal ESA, USFWS and the National Marine Fisheries Service (NMFS) have authority over projects that may result in “take” of a federally listed species. In general, ESA Section 7 prohibits persons (including private parties) from “taking” listed endangered or threatened fish and wildlife species on private property, and from “taking” listed endangered or threatened plant species in areas under Federal jurisdiction or in violation of State law (16 U.S. Code (USC) 1532, 50 Code of Federal Regulations (CFR) 17.3). Under the ESA, the definition of “take” is to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct” as part of an intentional or negligent act or omission. The term “harm” includes acts that result in death or injury to wildlife. Such acts may include significant habitat modification or degradation if it results in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Section 7(a) of the ESA, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed for listing or is listed as endangered or threatened. Section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species or to destroy or



adversely modify its designated critical habitat. If a Federal action may affect a listed species or its designated critical habitat, the responsible Federal agency must enter into formal consultation with USFWS or NMFS, depending on the species.

As defined in the ESA, critical habitat is a specific geographic area that is essential for the conservation of a threatened or endangered species and that may require special management and protection. It may include an area that is not currently occupied by the species but that will be needed for its recovery. Critical habitats are designated to ensure that actions authorized by Federal agencies will not destroy or adversely modify designated critical habitat, thereby protecting areas necessary for the conservation of the species.

#### ***Fish and Wildlife Coordination Act***

The Fish and Wildlife Coordination Act (16 USC 661–667e, as amended) provides the basic authority for the involvement of USFWS in evaluating impacts on fish and wildlife from proposed water resource development projects. It requires that fish and wildlife resources receive consideration equal to that of other project features. It also requires Federal agencies that construct, license, or permit water resource development projects to first consult with USFWS (and NMFS in some instances) and State fish and wildlife agencies regarding the impacts of the proposed action on fish and wildlife resources and measures to mitigate these impacts.

#### ***Bald Eagle Protection Act***

The bald eagle and golden eagle are federally protected under the Bald Eagle Protection Act (16 USC 668–668c). It is illegal to take, possess, sell, purchase, barter, offer to sell or purchase or barter, transport, export, or import a live or dead bald or golden eagle or any eagle part, nest, or egg unless authorized by the Secretary of the Interior. The Bald Eagle Protection Act defines “take” as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb” (16 USC 668–668d). USFWS has further defined “disturb” under the act as follows (72 Federal Register (FR) 31132–31140 (June 5, 2007)):

*Disturb means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle; (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.*

Active nest sites are also protected from disturbance during the breeding season, generally February through September.

USFWS has proposed new permit regulations to authorize the take of bald and golden eagles under the Bald Eagle Protection Act, generally where the take to

be authorized is associated with otherwise lawful activities (72 FR 31141–31155 (June 5, 2007)). With the delisting of the bald eagle in 2007 from the ESA, this act is the primary law protecting bald eagles and golden eagles. Violators are subject to fines and/or imprisonment for up to 1 year.

### ***Migratory Bird Treaty Act***

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 703–711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21). This prohibition includes direct and indirect acts, although harassment and habitat modifications are not included unless they result in direct loss of birds, nests, or eggs. The current list of species protected by the MBTA, which can be found in Title 50, Section 10.13 of the Code of Federal Regulations, includes several hundred species, essentially all native birds. Loss of nonnative species, such as house sparrows (*Passer domesticus*), European starlings (*Sturnus vulgaris*), and rock pigeons (*Columba livia*), is not covered by this statute.

### ***U.S. Forest Service Sensitive Species***

The National Forest Management Act requires USFS to “provide for a diversity of plant and animal communities” (16 USC 1604(g)(3)(B)) as part of its multiple-use mandate. USFS must maintain “viable populations of existing native and desired nonnative species in the planning area” (36 CFR 219.19). The Sensitive Species program is designed to meet this mandate and to demonstrate USFS’s commitment to maintaining biodiversity on National Forest System lands. The program is a proactive approach to conserving species to prevent a trend toward listing under the ESA and to ensure the continued existence of viable, well-distributed populations. A “Sensitive Species” is any species of plant or animal that has been recognized by the Regional Forester to need special management to prevent the species from becoming threatened or endangered.

### ***Shasta-Trinity National Forest Land and Resource Management Plan***

The Shasta-Trinity National Forest (STNF) Land and Resource Management Plan (LRMP) contains forest goals, standards, and guidelines designed to guide the management of STNF. The following goals, standards, and guidelines related to wildlife resource issues associated with the study area were excerpted from the STNF LRMP (USFS 1995).

**U.S. Forest Service Survey and Manage** In 1994, BLM and USFS adopted standards and guidelines developed as part of the Northwest Forest Plan. These standards and guidelines address management of habitat for late-successional and old-growth forest related species within the range of the northern spotted owl. The Northwest Forest Plan was designed to address human and environmental needs served by the Federal forests of the western part of the Pacific Northwest and Northern California. The development of the Northwest



Forest Plan was triggered in the early 1990s by the listing of the northern spotted owl and marbled murrelet as threatened under the ESA.

To mitigate potential impacts on plant and wildlife species that have the potential to occur within the range of the northern spotted owl, surveys are required for species thought to be rare, or whose status is unknown because of a lack of information. These species became known as the Survey and Manage species. The Northwest Forest Plan has gone through several revisions since its implementation in 1994, including the elimination of the Survey and Manage Mitigation Measure Standards and Guidelines in 2004. However, these guidelines were reinstated in January 2006 as the result of a court order.

### *Biological Diversity*

*Goals (LRMP, p. 4-4)* Integrate multiple resource management on a landscape level to provide and maintain diversity and quality of habitats that support viable populations of plants, fish, and wildlife.

#### *Standards and Guidelines (LRMP, p. 4-14)*

- **Natural Openings** – Management of natural openings will be determined at the project level consistent with desired future conditions.
- **Snags** – Over time, provide the necessary number of replacement snags to meet density requirements as prescribed for each land allocation and/or management prescription. Live, green culls and trees exhibiting decadence and/or active wildlife use are preferred.
- **Hardwood** – Apply the following standards in existing hardwood types:
  - Manage hardwood types for sustainability.
  - Conversion to conifers will only take place to meet desired future ecosystem conditions.
  - Where hardwoods occur naturally within existing conifer types on suitable timber lands, manage for a desired future condition for hardwoods as identified during ecosystem analysis consistent with management prescription standards and guidelines. Retain groups of hardwoods over single trees.
- Threatened, Endangered, and Sensitive Species (Plants and Animals)

#### *Goals (LRMP, p. 4-5)*

- Monitor and protect habitat for federally listed Threatened and Endangered and candidate species. Assist in recovery efforts for

Threatened and Endangered species. Cooperate with the State to meet objectives for state listed species.

- Manage habitat for sensitive plants and animals in a manner that will prevent any species from becoming a candidate for Threatened and Endangered status.

*Goals (LRMP, p. 4-6)*

- Meet habitat or population objectives established for management indicators.
- Cooperate with Federal, State, and local agencies to maintain or improve wildlife habitat.
- Maintain natural wildlife species diversity by continuing to provide special habitat elements within Forest ecosystems.

*Standards and Guidelines (LRMP, pp. 4-29 through 4-30)*

- Minimize accidental electrocution of raptors by ensuring that newly constructed overhead power lines meet safe design standards.
- Consider transplants, introductions, or reintroductions of wildlife species only after ecosystem analysis and coordination with other agencies and the public.
- Manage habitat for Neotropical migrant birds to maintain viable population levels.
- Develop interpretation/view sites for wildlife viewing, photography, and study. Provide pamphlets, slide shows, and other educational material that enhance the watchable wildlife and other interpretive programs.
- Maintain and/or enhance habitat for federally listed threatened and endangered or Forest Service Sensitive species consistent with individual species recovery plans.

**Management Guide for the Shasta and Trinity Units of the Whiskeytown-Shasta-Trinity National Recreation Area** The Management Guide for the Whiskeytown-Shasta-Trinity National Recreation Area, including the Shasta Unit of the National Recreation Area (NRA), contains management guidance intended to achieve or maintain a desired condition. These strategies take into account opportunities, management recommendations for specific projects, and mitigation measures needed to achieve specific goals. The following guidance relative to wildlife resource issues associated with the project site were excerpted from the management guide (USFS 2014).



### *Maintaining Key Wildlife Habitat Components*

- Limestone outcrops within the Shasta Unit are recognized as a unique habitat component for various wildlife species. The cool moist microclimate present within these outcrops provides the habitat to escape the hot, dry summer season. Maintaining limestone habitats is a top priority within the NRA. Actions which could negatively impact limestone habitats (road building, dozer-line construction, piling and burning) will be avoided if limestone habitats would be degraded.
- Due to the important role down woody material and snags play in the ecosystem, design projects to maintain large down logs and large snags. In general, down logs and snags will be retained unless they pose a direct risk to public safety. It is recognized that projects implementing prescribed fire will directly impact large snags and logs. These projects are encouraged, as they are essential in maintaining a healthy and diverse ecosystem. It is also recognized that the effects of prescribed fire on snags and down logs is a dynamic process, as fire will consume some snags and logs, but also some trees are killed by fire, which provides for recruitment of new snags and logs.
- Bald eagle nest territories will be inventoried and vegetation management plans will be developed to ensure that suitable nest and perch trees are maintained over time.
- Chaparral and woodland habitat management will occur to meet wildlife objectives.
- Interpretive materials will address the need to conserve rare plant communities in accordance with the NRA Interpretive Plan.
- Diversity of native species will be emphasized. Eradication program will be implemented for nonnative, introduced species in areas where healthy, botanically diverse plant communities are necessary to meet ecosystem management objectives.

### *Wildlife*

- Management activities will assure population viability for all native and nonnative desirable species. Management to insure viability will occur within occupied habitat for bald eagle, peregrine falcon, northern spotted owl, northern goshawk, willow flycatcher, western pond turtle, Pacific fisher, Shasta salamander, and other special-status species in accordance with species and/or territory management plans, Forest Orders, and appropriate laws and policy.

- Surveys will continue within potential suitable habitats to determine occupancy status for Threatened, Endangered, sensitive, and candidate species.
- Cooperation will continue with the CDFW and USFWS regarding habitat management of wildlife species inhabiting the NRA. Consultation with USFWS will continue regarding habitat management for threatened and endangered species.

***Section 404 of the Clean Water Act***

The U.S. Army Corps of Engineers regulates discharges of dredged or fill materials into waters of the United States under Section 404 of the Clean Water Act. Waters of the United States include lakes, rivers, streams, and relatively permanent tributaries and adjacent wetlands. Wetlands are defined under Section 404 as areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support (and that do support under normal circumstances) a prevalence of vegetation typically adapted for life in saturated soil conditions. Activities that require a permit under Section 404 include, but are not limited to, placing fill or riprap, grading, mechanized land clearing, and dredging. Any activity that results in the deposit of dredged or fill material below the ordinary high-water mark of waters of the United States or within a jurisdictional wetland usually requires a Section 404 permit, even if the area is dry at the time the activity takes place.

***Executive Order 11312: Invasive Species***

Executive Order 13112 directs Federal agencies to use relevant programs and authorities to do all of the following:

- Prevent the introduction of invasive species
- Detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner
- Monitor invasive species populations accurately and reliably
- Provide for restoration of native species and habitat conditions in ecosystems that have been invaded
- Conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species
- Promote public education on invasive species and the means to address them
- Refrain from authorizing, funding, or carrying out actions that it believes are likely to cause or promote the introduction or spread of



invasive species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions

Executive Order 11312 established a national Invasive Species Council made up of Federal agencies and departments and a supporting Invasive Species Advisory Committee composed of State, local, and private entities. The Invasive Species Council and Advisory Committee oversee and facilitate implementation of the executive order, including preparation of a national invasive species management plan.

***Executive Order 11990: Protection of Wetlands***

Executive Order 11990 established the protection of wetlands and riparian systems as the official policy of the Federal government. It requires all Federal agencies to consider wetland protection as an important part of their policies and take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands.

***Executive Order 13186: Migratory Birds***

Executive Order 13186 directs executive departments and agencies to take certain actions to further implement the MBTA. It requires that each Federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations develop and implement a memorandum of understanding (MOU) with USFWS that will promote the conservation of migratory bird populations.

***Executive Order 13443 (Facilitation of Hunting Heritage and Wildlife Conservation)***

Executive Order 13443 directs Federal agencies that have programs and activities that have a measurable effect on public land management, outdoor recreation, and wildlife management, including the U.S. Department of the Interior and the U.S. Department of Agriculture, to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat.

**State**

***California Endangered Species Act***

Under the CESA, CDFW has the responsibility for maintaining a list of endangered and threatened species (California Fish and Game Code, Section 2070). CDFW also maintains a list of “candidate species,” which are species for which CDFW has issued a formal notice that they are under review for addition to the list of endangered or threatened species. In addition, CDFW maintains lists of “species of special concern,” which serve as species “watch lists.”

Pursuant to the requirements of CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any State-listed endangered or threatened species may be present in the project study area and, if so, whether the proposed project would have a potentially significant impact on any of these species. In addition, CDFW encourages informal consultation on any proposed project that may affect a species that is a candidate for state listing.

Project-related impacts on species listed as endangered or threatened under the CESA would be considered significant. State-listed species are fully protected under the mandates of the CESA. “Take” of protected species incidental to otherwise lawful management activities may be authorized under Section 2081 of the California Fish and Game Code. Under the CESA, “take” is defined as an activity that would directly or indirectly kill an individual of a species, but the definition does not include “harm” or “harass,” as the Federal act does. As a result, the threshold for take under the CESA is higher than that under the ESA.

Authorization from CDFW would be in the form of an incidental take permit or as a consistency determination (California Fish and Game Code, Section 2080.1(a)). Section 2080.1(a) of the California Fish and Game Code authorizes CDFW to accept a Federal biological opinion as the take authorization for a state-listed species when a species is listed under both the ESA and the CESA.

***Sections 3503 and 3513 of the California Fish and Game Code –  
Protection of Birds of Prey***

Under Section 3503 of the California Fish and Game Code, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird except as otherwise provided in other sections. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptors (birds in the order of Falconiformes or Strigiformes (birds of prey) – i.e., eagles, hawks, owls, and falcons), including their nests or eggs. Section 3513 provides for adoption of the MBTA’s provisions. It states that it is unlawful to take or possess any migratory nongame bird as designated in the MBTA or any part of such migratory nongame bird. These State codes offer no statutory or regulatory mechanism for obtaining an incidental take permit for the loss of nongame, migratory birds. Typical violations include destruction of active raptor nests resulting from removal of vegetation in which the nests are located. Violation of Sections 3503.5 and 3513 could also include disturbance of nesting pairs that results in failure of an active raptor nest.

***Fully Protected Species under the Fish and Game Code***

Protection of fully protected species is described in four sections of the Fish and Game Code (Sections 3511, 4700, 5050, and 5515) that list 37 fully protected species. These statutes prohibit take or possession at any time of fully protected species. CDFW is unable to authorize incidental take of fully protected species when activities are proposed in areas inhabited by those species. CDFW has informed non-Federal agencies and private parties that they must avoid take of any fully protected species in carrying out projects.



***Section 1602 of the California Fish and Game Code – Streambed Alteration***

Diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by CDFW, pursuant to Section 1602 of the California Fish and Game Code. The regulatory definition of a stream is a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports wildlife, fish, or other aquatic life. This includes watercourses that have a surface or subsurface flow that supports or has supported riparian vegetation. CDFW's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A CDFW streambed alteration agreement must be obtained for a project that would result in an impact on a river, stream, or lake.

***Section 401 Water Quality Certification/Porter-Cologne Water Quality Control Act***

Under Section 401 of the Clean Water Act, an applicant for a Section 404 permit must obtain a certificate from the appropriate State agency stating that the intended dredging or filling activity is consistent with the State's water quality standards and criteria. In California, the authority to grant water quality certification is delegated by the State Water Resources Control Board to the nine regional water quality control boards (RWQCB). Each of the RWQCBs must prepare and periodically update basin plans for water quality control in accordance with the Porter-Cologne Water Quality Control Act. Each basin plan sets forth water quality standards for surface water and groundwater, as well as actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Basin plans offer an opportunity to protect wetlands through the establishment of water quality objectives. The RWQCB's jurisdiction includes federally protected waters as well as areas that meet the definition of "waters of the state." A water of the state is defined as any surface water or groundwater, including saline waters, within the boundaries of California. The RWQCB has the discretion to take jurisdiction over areas not federally protected under Section 401, provided that those areas meet the definition of waters of the state. Mitigation requiring no net loss of wetlands functions and values of waters of the State is typically required by the RWQCB.

***California Department of Fish and Wildlife Species Designations***

CDFW maintains an informal list of species called "species of special concern." These are broadly defined as plant and wildlife species that are of concern to CDFW because of population declines and restricted distributions, and/or because they are associated with habitats that are declining in California. These species are inventoried in the CNDDB regardless of their legal status. Impacts on species of special concern may be considered significant.

**Regional and Local**

Shasta, Tehama, Glenn, Sutter, Sacramento, and Yolo counties and the cities of Redding, Colusa, and Sacramento have established codes and policies that

address protection of natural resources, including vegetation, sensitive species, and trees, and are applicable to the project.

Shasta County's general plan emphasizes that the maintenance and enhancement of quality fish and wildlife habitat is critical to the recreation and tourism industry, and acknowledges that any adverse and prolonged decline of these resources could result in negative impacts on an otherwise vibrant industry. The general plan identifies efforts to protect and restore these habitats to sustain the long-term viability of the tourism and recreation industry (Shasta County 2004).

The City of Redding's general plan strives to strike a balance between development and conservation by implementing several measures such as creek-corridor protection, sensitive hillside development, habitat protection, and protection of prominent ridge lines that provide a backdrop to the city (City of Redding 2000).

Tehama County's general plan update provides an overarching guide to future development and establishes goals, policies, and implementation measures designed to address potential changes in county land use and development. The general plan identifies the importance of retaining agriculture as one of the primary uses of land in Tehama County (Tehama County 2009).

Glenn County's general plan provides a comprehensive plan for growth and development in Glenn County for the next 20 years (2007–2027). This plan recognizes that public lands purchased for wildlife preservation generate economic activity as scientists and members of the public come to view and study remnant ecosystems (Glenn County 1993).

The City of Colusa's general plan seeks to promote its natural resources through increased awareness and improved public access (City of Colusa 2007).

Sutter County's general plan contains policies that generally address preservation of natural vegetation, including wetlands. It requires that new development mitigate the loss of federally protected wetlands to achieve "no net loss," but it does not include any other specific requirements (Sutter County 2010).

Sacramento County's general plan contains goals and policies that promote management, protection, and restoration of natural habitats and sensitive species of plants and animals throughout the county (Sacramento County 2011). This includes policies for "no net loss" of riparian and oak woodland. The Sacramento County general plan includes specific setbacks from streams that can be 200 feet wide; development within setbacks is prohibited except for passive recreation and stormwater facilities in the outside most 50 feet. It also addresses the need to conserve vernal pools and ephemeral wetlands to ensure no net loss of vernal pool acreage. Several policies specifically promote



protection of native oak trees, and, in some areas of the county, seek to ensure that there is no net loss of canopy area.

Chapter 12.56, “Trees Generally,” of the City of Sacramento Municipal Code addresses the protection of trees within the city boundaries, including general protection of all trees on city property and specific protection of heritage trees.

Yolo County’s general plan aims to provide an active and productive buffer of farmland and open space separating the Bay Area from Sacramento, and integrating green spaces into its communities (Yolo County 2009).

## **Federal, State, and Local Programs and Projects**

### ***California Bay-Delta Authority***

The California Bay-Delta Authority was established as a State agency in 2003 to oversee implementation of CALFED for the 25 Federal and State agencies working cooperatively to improve the quality and reliability of California’s water supplies while restoring the Bay-Delta ecosystem. The Ecosystem Restoration Program has provided a funding source for projects that include those involving acquisition of lands within the Sacramento River Conservation Area, initial baseline monitoring and preliminary restoration planning, and preparation of long-term habitat restoration management and monitoring plans.

### ***Cantara Trustee Council***

The Cantara Trustee Council administers a grant program that has provided funding for numerous environmental restoration projects in the primary study area, including programs in the Fall River watershed, Sulphur Creek, the upper Sacramento River, Middle Creek, lower Clear Creek, Battle Creek, Salt Creek, and Olney Creek. The Cantara Trustee Council is a potential local sponsor for future restoration actions in the primary study area. The Cantara Trustee Council includes representatives from CDFW, USFWS, the Central Valley Regional Water Quality Control Board, the California Sportfishing Protection Alliance, and the Shasta Cascade Wonderland Association.

### ***Resource Conservation Districts***

Numerous resource conservation districts (RCD) are within the study area. Once known as soil conservation districts, RCDs were established under California law with a primary purpose to implement local conservation measures. Although RCDs are locally governed agencies with locally appointed, independent boards of directors, they often have close ties to county agencies and the National Resources Conservation Service. RCDs are empowered to conserve resources within their districts by implementing projects on public and private lands and to educate landowners and the public about resource conservation. They are often involved in the formation and coordination of watershed working groups and other conservation alliances. In the Shasta Lake and upper Sacramento River vicinity, districts include the Western Shasta County RCD and the Tehama County RCD. To the east are the

Fall River and Pit River RCDs, and to the west and north are the Trinity County and Shasta Valley RCDs.

### ***Riparian Habitat Joint Venture***

The Riparian Habitat Joint Venture (RHJV) was initiated in 1994 and includes signatories from 18 Federal, State, and private agencies. The RHJV promotes conservation and the restoration of riparian habitat to support native bird population through three goals:

- Promote an understanding of the issues affecting riparian habitat through data collection and analysis
- Double riparian habitat in California by funding and promoting on-the-ground conservation projects
- Guide land managers and organizations to prioritize conservation actions

RHJV conservation and action plans are documented in The Riparian Bird Conservation Plan (RHJV 2004). The conservation plan targets 14 “indicator” species of riparian-associated birds and provides recommendations for habitat protection, restoration, management, monitoring, and policy. The report notes habitat loss and degradation as one of the most important factors causing the decline of riparian birds in California. The RHJV has participated in monitoring efforts within the Sacramento National Wildlife Refuge Complex and other conservation areas. The RHJV’s conservation plan identifies lower Clear Creek as a prime breeding area for yellow warblers (*Setophaga petechia*) and song sparrows (*Melospiza melodia*), advocating a continuous riparian corridor along lower Clear Creek. Other recommendations of the conservation plan apply to the North Delta Offstream Storage Investigation study area in general.

### ***Sacramento River Advisory Council***

In 1986 the California Legislature passed Senate Bill (SB) 1086, which called for a management plan for the Sacramento River and its tributaries to protect, restore, and enhance fisheries and riparian habitat in an area stretching from the confluence of the Sacramento River with the Feather River and continuing northward to Keswick Dam about 4 miles north of Redding. The law established an advisory council that included representatives of Federal and State agencies, county supervisors, and representatives of landowners, water contractors, commercial and sport fisheries, and general wildlife and conservation interests. Responsibilities of the advisory council included development of the *Sacramento River Conservation Area Forum Handbook* (Resources Agency 2003). This action also resulted in formation in May 2000 of the Sacramento River Conservation Area (SRCA) Forum, a nonprofit, public benefit corporation with a board of directors that includes private landowners and public interest representatives from a seven-county area, an appointee of the



California Natural Resources Agency (Resources Agency), and ex-officio members from six Federal and State resource agencies.

***Sacramento River Conservation Area Program***

The SRCA Program has an overall goal of preserving remaining riparian habitat and reestablishing a continuous riparian ecosystem along the Sacramento River between Redding and Chico, and reestablishing riparian vegetation along the river from Chico to Verona. The program is to be accomplished through an incentive-based, voluntary river management plan. The *Upper Sacramento River Fisheries and Riparian Habitat Management Plan* (Resources Agency 1989) identifies specific actions to help restore the Sacramento River fishery and riparian habitat between the Feather River and Keswick Dam. The *Sacramento River Conservation Area Forum Handbook* (Resources Agency 2003) is a guide to implementing the program. The Keswick Dam-to-Red Bluff portion of the conservation area includes areas within the 100-year floodplain, existing riparian bottomlands, and areas of contiguous valley oak woodland, totaling approximately 22,000 acres. The 1989 fisheries restoration plan recommended several actions specific to the study area:

- Fish passage improvements at RBPP (completed)
- Modification of the Spring Creek Tunnel intake for temperature control (completed)
- Spawning gravel replacement program (ongoing)
- Development of side-channel spawning areas, such as those at Turtle Bay in Redding (ongoing)
- Structural modifications to the Anderson-Cottonwood Irrigation District Dam to eliminate short-term flow fluctuations (completed)
- Maintaining instream flows through coordinated operation of water facilities (ongoing)
- Improvements at the Coleman National Fish Hatchery (partially completed)
- Measures to reduce acute toxicity caused by acid mine drainage and heavy metals (ongoing)
- Various fisheries improvements on Clear Creek (partially completed)
- Flow increases, fish screens, and revised gravel removal practices on Battle Creek (beginning summer 2006, ongoing monitoring)

- Control of gravel mining, improvements of spawning areas, improvements of land management practices in the watershed, and protection and restoration of riparian vegetation along Cottonwood Creek (ongoing)

### ***Sacramento River National Wildlife Refuge***

The Sacramento River National Wildlife Reserve (SRNWR) is composed of many units between the cities of Red Bluff and Princeton. The SRNWR along the middle Sacramento River is part of the Sacramento National Wildlife Refuge Complex, consisting of five refuges and three wildlife management areas within the Sacramento Valley. Reaches and subreaches of the river are delineated based generally on transitions in fluvial geomorphic riverine conditions, although county boundaries were considered as well. The middle Sacramento River region between Red Bluff and Colusa includes three units within the Chico Landing Subreach that contain restoration project sites addressed in the Sacramento River–Chico Landing Subreach Habitat Restoration Draft Environmental Impact Report (CBDA 2005). In addition, three areas proposed for restoration in this area occur within the larger SRNWR units that were evaluated in the Environmental Assessment for Proposed Restoration Activities on the Sacramento River National Wildlife Refuge (USFWS 2001; CBDA 2005).

In June 2005, USFWS issued the Sacramento River National Wildlife Refuge Final Comprehensive Conservation Plan and Environmental Assessment and Finding of No Significant Impact (USFWS 2005b) to serve as an integrated management plan for land that it acquires and manages for inclusion in the SRNWR. The SRNWR final comprehensive conservation plan includes goals, objectives, and strategies to guide management of lands within the SRNWR. It also includes assessments of and establishes parameters for “compatible uses,” which are uses that are considered compatible with the primary purposes for which the area was established. Riparian habitat restoration projects are being implemented under cooperative agreements between USFWS and other entities such as The Nature Conservancy (TNC) in accordance with the SRNWR final comprehensive conservation plan.

### ***Sacramento River Wildlife Area***

The Sacramento River Wildlife Area is managed by CDFW and consists of approximately 3,770 acres of important riparian habitat located along a 70-mile reach of the lower Sacramento River. These lands are managed to protect and enhance habitat for wildlife species, and to provide the public with compatible, wildlife-related recreational uses. This management is guided by the Sacramento River Comprehensive Management Plan (CDFG 2004).

### ***Sacramento River Preservation Trust***

The Sacramento River Preservation Trust is a private, nonprofit organization active in environmental education and advocacy to preserve the natural environmental values of the Sacramento River. The trust has participated in



various conservation and land acquisition projects, including securing lands for the SRNWR. The group is pursuing designation of a portion of the Sacramento River between Redding and Red Bluff as a national conservation area.

#### ***Sacramento River Watershed Program***

The Sacramento River Watershed Program is an effort to bring stakeholders together to share information and work together to address water quality and other water-related issues within the Sacramento River watershed. The group is funded congressionally through the U.S. Environmental Protection Agency. The program's primary goal is "to ensure that current and potential uses of Sacramento River watershed resources are sustained, restored, and where possible, enhanced while promoting the long-term social and economic vitality of the region." The Sacramento River Watershed Program manages grants for the Sacramento River Toxic Pollutants Control Program; performs extensive water quality monitoring and data collection and management for the watershed; and is instrumental in the study and monitoring of toxic pollutants. Although the program does not implement restoration projects, it is a potential partner for coordinating research and monitoring through consensus-based collaborative partnerships and promoting mutual education among the stakeholders of the Sacramento River watershed.

#### ***Sacramento Watersheds Action Group***

The Sacramento Watersheds Action Group (SWAG) is a nonprofit corporation that secures funding for, designs, and implements projects that provide watershed restoration, streambank and slope stabilization, erosion control, watershed analysis, and road removal. SWAG has successfully worked with local groups, agencies, and organizations to fund and complete restoration projects on the Sacramento River and tributaries downstream from Keswick Dam. Their projects include development of the Sulphur Creek Watershed Analysis and Action Plan, the Whiskeytown Reservoir Shoreline Erosion Control Project, the Sulphur Creek Crossing Restoration Project, and the Lower Sulphur Creek Realignment and Riparian Habitat Enhancement Project. SWAG is a potential local sponsor for watershed restoration actions in the study area.

#### ***Shasta Land Trust***

The Shasta Land Trust is a regional, nonprofit organization dedicated to conserving open space, wildlife habitat, and agricultural land. This organization works with public agencies and private landowners and is funded primarily through membership dues and donations. It employs various voluntary programs to protect and conserve valuable lands using conservation easements, land donations, and property acquisitions. The trust is a potential local partner for restoration activities in the Shasta Dam-to-Red Bluff area.

#### ***The Nature Conservancy***

TNC is a private, nonprofit organization involved in environmental restoration and conservation throughout the United States and the world. TNC approaches environmental restoration primarily through strategic land acquisition from

willing sellers and obtaining conservation easements. Some of the lands are retained by TNC for active restoration, research, or monitoring activities, while others are turned over to government agencies such as USFWS or CDFW for long-term management. Lower in the Sacramento River basin, TNC has been instrumental in acquiring and restoring lands in the SRNWR and managing several properties along the Sacramento River. It also has pursued conservation easements on various properties at tributary confluences, including Cottonwood and Battle Creeks.

***The Trust for Public Land***

The Trust for Public Land is a national, nonprofit organization involved in preserving lands with natural, historic, cultural, or recreational value, primarily through conservation real estate. This organization's Western Rivers Program has been involved in conservation efforts along the Sacramento River between Redding and Red Bluff (BLM's Sacramento River Bend Management Area), Battle Creek, Paynes Creek, Inks Creek, and Fenwood Ranch in Shasta County. The group promotes public ownership of conservation lands to ensure public access and enjoyment.



## Chapter 2

# Wildlife Resources Attachments

This technical report includes the following attachments:

- Attachment 1, “Special-Status Wildlife Species Potentially Occurring in the Shasta Lake and Vicinity Portion of the Primary Study Area”
- Attachment 2, “Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area”
- Attachment 3, “Breeding Bird Surveys 2007 – 2013”
- Attachment 4, “Species Accounts for Special-Status Wildlife in the Primary Study Area Downstream from Shasta Dam”
- Attachment 5, “Federal Lists of Special-Status Wildlife Species in the Vicinity of the Primary Study Area”
- Attachment 6, “Special-Status Wildlife Species with Potential to , Occur in the Primary and Extended Study Areas by Area”
- Attachment 7, “List of All Sensitive Wildlife Species in the Extended Study Area Reported to the CNDDDB”
- Attachment 8, “Forest Carnivore Survey Report”
- Attachment 9, “Shasta Salamander Survey Report”
- Attachment 10, “Terrestrial Mollusk Survey Report”
- Attachment 11, “California Red-legged Frog Habitat Assessment Reports, Shasta Lake and Vicinity Portion of the Primary Study Area”
- Attachment 12, “Biological Characterizations, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Henderson Open Space”
- Attachment 13, “Biological Characterizations, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Tobiasson Island”

- Attachment 14, “Biological Characterizations, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Shea Island Complex”
- Attachment 15, “Biological Characterizations, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Kapusta Island”
- Attachment 16, “Biological Characterizations, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Anderson River Park”
- Attachment 17, “Biological Characterizations, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Reading Island”
- Attachment 18, “California Red-legged Frog Habitat Assessment, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Henderson Open Space”
- Attachment 19, “California Red-legged Frog Habitat Assessment, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Tobiasson Island”
- Attachment 20, “California Red-legged Frog Habitat Assessment, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Shea Island Complex”
- Attachment 21, “California Red-legged Frog Habitat Assessment, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Kapusta Island”
- Attachment 22, “California Red-legged Frog Habitat Assessment, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Anderson River Park”
- Attachment 23, “California Red-legged Frog Habitat Assessment, SLWRI Potential Sacramento River Downstream Habitat Restoration Areas: Reading Island”



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- Yolo County. 2009 (November 10). 2030 Countywide General Plan. Adopted November 2009, Resolution No. 09-189. Planning and Public Works Department. Woodland, California.